

**State Highway Congestion Monitoring Program
(HICOMP)**

Annual Report



January 2005

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Foreword

The purpose of the statewide Highway Congestion Monitoring Program (HICOMP) report is to measure congestion occurring on urban area freeways in California. The California Department of Transportation (Caltrans) has been publishing the HICOMP report since 1987.

Over the past five years, Caltrans has been examining ways to improve congestion monitoring. One effort in development, the Freeway Performance Measurement System (PeMS) is an Internet-based tool that can be used to monitor conditions on urban freeways. PeMS will allow users to produce congestion monitoring reports using automatically collected data from sensors statewide.

In conjunction with PeMS, Caltrans continues to address issues such as the current state of technology, methodological concerns, and stakeholders' interest in both recurrent and non-recurrent congestion. Caltrans completed a study to distinguish between recurrent congestion (i.e., regularly occurring peak period congestion) and non-recurrent congestion caused by incidents. Caltrans is continuing to develop tools and techniques to measure the impact of accidents, weather, and special events on traffic congestion.

When the results of these efforts are adopted, future reports will follow a revised methodology. The new methodology will address shortcomings of current practices and support other Caltrans initiatives, such as system performance measurement and system management strategies. Until that time, reports will continue to use the traditional methodology.

More districts are adopting automatic data collection technologies. District 7 (Los Angeles/Ventura) has always used automatic data collection, while District 11 in San Diego has been increasing the use of loop detectors to collect congestion data. District 8 (San Bernardino/Riverside Counties) is using loop detector data on some of its freeway segments, and District 12 used loop detectors for the first time in 2002.

The 2003 HICOMP report presents congestion data on California urban freeway segments with a history of recurrent congestion. It does not include congestion on other State highways or local surface streets. Non-recurrent congestion such as weekend, holiday, or special event generated traffic congestion is also not included. **THIS REPORT REPRESENTS AVERAGE TRAFFIC CONDITIONS ON A TYPICAL WEEKDAY AND IS USEFUL FOR MAKING REGIONAL COMPARISONS OF FREEWAY PERFORMANCE ONLY.**

Estimates in this report are based on a limited number of observations. Actual conditions vary daily and seasonally. Due to differences in the way that congestion is defined and measured, the data presented in this report may not be comparable to the findings of other studies.

1. Introduction

Transportation facility construction and expansion has not kept pace with the growth of travel demand. This has resulted in an increase in urban freeway congestion over the past decade in most California metropolitan areas. From the public's perspective, the most noticeable effect of congestion on urban mobility is increased traffic delay. "Rush-hour" traffic in larger cities no longer occurs only during the traditional A.M. and P.M. peak periods, but also extends into much of a normal day.

Congestion can be described as either *recurrent* or *non-recurrent*. Recurrent congestion is the regular, everyday peak period delays that occur when the design capacity of a freeway is exceeded and low speeds result. Irregular events such as accidents, sporting events, maintenance, or short-term construction cause non-recurrent congestion. This report assumes that non-recurrent congestion is roughly equal to recurrent congestion. **THE PURPOSE OF THE CURRENT STATE HIGHWAY CONGESTION MONITORING PROGRAM (HICOMP) REPORT IS TO PRESENT RECURRENT CONGESTION DATA.** In some cases, the report discusses non-recurrent congestion, but in these cases, it is only to arrive at an approximation of the impacts of total congestion.

An objective of the California Department of Transportation (Caltrans) is to increase the efficiency of existing roads and other transportation facilities in order to reduce delays. The HICOMP report helps Caltrans to meet this objective by identifying the locations and extent of recurrent congestion on California's urban freeways. The HICOMP database provides the information needed to evaluate freeway performance so that Caltrans can establish priorities and direct resources to the areas with the most congestion. Data obtained from the congestion monitoring program also may be used to evaluate the effectiveness of technologies and strategies used to reduce congestion by comparing the changes in congestion before and after the implementation of new systems and programs.

1.1 Definition of Recurrent Congestion

This report defines recurrent congestion as a condition lasting for 15 minutes or longer where travel demand exceeds freeway design capacity and vehicular speeds are 35 miles per hour (mph) or less during peak commute periods on a typical incident-free weekday. This report uses three parameters to describe recurrent congestion:

- 1) Magnitude
- 2) Extent
- 3) Duration

Magnitude is the difference in time between the time it takes to travel a segment at the recorded congested speed and the travel time at 35 mph. "Vehicle-hours of delay per day" (vhdpd) is the term used to express the magnitude of the delay.

Extent is the length of a freeway segment by direction that experiences speeds below 35 mph for 15 minutes or more. Extent is expressed in terms of congested directional miles (cdm). It is important to note that a one-mile stretch of roadway contains two directional miles (one mile for each direction of travel). Directional miles differ from lane-miles, which is the number of lanes in a given direction multiplied by the length of the segment in that direction.

Duration is the length of time expressed in hours that the directional segment remains congested.

The HICOMP report discusses the magnitude and extent of congestion. Maps included in the report show the location and duration of congestion for all Caltrans districts experiencing congestion.

1.2 Data Collection Methodologies

Caltrans uses two principal methods to collect congestion data on urban freeways. The most common method is to drive specially equipped vehicles at regular intervals along freeways during the hours of recurrent peak period congestion. This is called the *floating vehicle* method, with the vehicles sometimes referred to as *probes* or *tachometer vehicles*. A tachometer system consists of a commercially available transmission sensor mounted in the engine compartment in line with the speedometer cable, a signal conditioner, and a laptop computer. The sensor counts the number of wheel rotations in one second and sends that data to a laptop computer. Software on the computer then translates this data into meaningful time, distance, and travel speed information.

The second method is to collect data from fixed sensors embedded in the pavement of the freeways. These sensors are permanent inductive loops (commonly referred to as *loop detectors*) placed at regular intervals along a freeway. Sometimes these loops control the timing of ramp meter traffic signals on California freeways. Exhibit 1-1 shows each district that reports congestion in the HICOMP report, the counties monitored in that district, and the type of technology used to collect congestion data. Appendix "A" at the end of this report contains a map showing all Caltrans districts and the counties that make up those districts.

Exhibit 1-1: Data Collection Methodology by District Reporting HICOMP Results

District (Office Location) Counties Monitored	Tachometer	Loop Detector
District 3 (Marysville) El Dorado, Placer, Sacramento	✓	
District 4 (Oakland) Alameda, Contra Costa, Marin, San Francisco San Mateo, Santa Clara, Solano, Sonoma	✓	
District 5 (San Luis Obispo) Monterey, San Luis Obispo Santa Cruz, Santa Barbara	✓	
District 6 (Fresno) Fresno, Kern	✓	
District 7 (Los Angeles) Los Angeles, Ventura	✓	✓
District 8 (San Bernardino) Riverside, San Bernardino	✓	✓
District 10 (Stockton) San Joaquin, Stanislaus	✓	
District 11 (San Diego) San Diego	✓	✓
District 12 (Irvine) Orange	✓	✓

In the tachometer method, a floating vehicle equipped with an electronic tachometer drives through congested areas along predetermined segments at 15 to 30-minute intervals. Each round trip is called a tachometer run. Typically, tachometer runs are made during peak hours, Tuesday through Thursday, in the spring and fall. Raw field data are collected at least two times for each segment and time period. For the 2003 HICOMP report, most runs took place in the fall of 2003, although some districts collected data in both the spring and fall of 2003.

The raw field data, combined with hourly traffic volumes, are converted into average daily vehicle-hours of delay and congested directional miles. The following formula produces the total delay associated with each segment:

$$\text{Daily Vehicle-hours of delay} = V \times D \times T$$

Where,

V - Volume in vehicles per hour = Number of lanes \times Vehicles per hour per lane¹

D - Duration of congestion in hours

T - Travel time (in hours) to cover a given distance under congested conditions minus the travel time at 35 mph.

¹ Vphpl is the design capacity of a road segment. Most districts use a value of 2,000 vphpl, although District 4 (Oakland) has been using a value of 2,200 vphpl since 1995.

If a driver observes an incident during a tachometer run or if traffic delay is caused by something other than “normal” recurrent congestion (e.g., inclement weather), the tachometer run is aborted.

Some Caltrans districts use electronic surveillance systems of loop detectors. The detectors are embedded in the pavement and are spaced approximately every half-mile. Communication lines transmit speed and volume data collected by the loop detectors to a mainframe computer in real-time.

District 7 (Los Angeles) uses loop detectors as its primary tool for measuring congestion, although for this year’s HICOMP the district used tachometer vehicles on some segments. In District 11 (San Diego), loop detector data have been used in conjunction with tachometer data since 1998, and each year more freeway segments are monitored using this technology. In 2001, District 8 began using loop detectors on some segments to produce the HICOMP report. District 12 began using loop detectors this year for one segment.

In District 7, printouts of vehicle speeds were made for specific freeway segments during peak commute periods. A preliminary analysis of the data was performed to select two representative fall days. A contour line drawn around each freeway segment where speeds fell below 35 mph identified locations where congestion occurred. The delay was then calculated for the area within the contour plot.

A similar approach was used in Districts 8, 11, and 12 but the data were analyzed using a Microsoft Access database program developed for this purpose. In these two districts, a statistical approach was used to estimate recurrent congestion days for each segment, and the delay was calculated using the same methodology as in District 7.

The tachometer and electronic surveillance methods each have advantages and disadvantages. The tachometer method records data for the entire length of the segment while the electronic method relies on fixed-point loop detectors that do not provide information about congested conditions between the loops. For the electronic method, assumptions are made about conditions between loops. However, an electronic surveillance system provides continuous coverage and captures almost all congestion occurrences. Tachometer runs generally are spaced 15 to 30 minutes apart, missing incremental congestion between runs. Furthermore, the cost of collecting tachometer severely limits the number of samples that can be collected. Unlike automatically collected data, which is collected each day of the year and each hour of the day, tachometer data is only collected a few days per year at selected locations and times.

2. Statewide Summary

Since last year's HICOMP report, California urban freeway recurrent congestion declined by four percent from 512,112 vehicle-hours of delay per day (vhdpd) to 492,032 vhdpd. Congested miles of urban area freeways showed a slight increase of around three percent over the same period, growing from 1,941 last year to 2,004 in 2003.

Exhibits 2-1 through 2-4 summarize these congestion results for each district:

- Daily vehicle-hours of delay (Exhibit 2-1)
- Congested directional miles (Exhibit 2-2)
- Total directional miles (Exhibit 2-3)
- Congested directional miles to total directional miles (Exhibit 2-4)

As shown in Exhibit 2-1, delay statewide declined from 512,112 vhdpd last year to 492,032 this year. District 4 in the San Francisco Bay Area contributed the most to this reduction in delay, declining 18 percent from 147,900 vhdpd to 121,800 vhdpd. District 12 (Orange County) lost nearly 9,000 vhdpd (a 12 percent decline) and District 3 (Marysville) showed a decrease of around 1,650 vhdpd (an 11 percent decline).²

Districts where delay grew in 2003 countered these declines. District 7 (Los Angeles and Ventura Counties) added over 12,600 vhdpd (an eight percent increase). District 11 (San Diego County) added nearly 2,600 vhdpd (a four percent increase).

Two Caltrans districts make up over 60 percent of all vehicle-hours of delay in California. District 7 accounts for around 36 percent of all delay, while District 4 contributes another 25 percent. Districts 11 and 12 account for another 27 percent. The remaining districts contribute only about 13 percent to statewide delay.

Exhibit 2-2 shows the congested directional miles for each district. Congested miles statewide grew by three percent from last year to 2,004. District 11 contributed the most to this increase adding 57 congested directional miles (up 21 percent) while District 7 contributed 28 miles (up five percent). District 4 reduced its congested miles by 30 miles (down eight percent) with Districts 8 and 10 also showing declines.

District 7 reports 648 congested miles, which is about a third of all congested miles in the state. Districts 4, 11, and 12 each contribute approximately 16 or 17 percent. Together, these four districts make up over 80 percent of all congested miles in the state.

Exhibit 2-3 shows total urban area freeway directional miles for each district. Between 1987 and 2003, statewide total miles grew by 802 miles (nearly 28 percent).

² Refer to Appendix "A" at the end of this report to see a map showing Caltrans District boundaries.

This increase is due to a number of factors, principally: (1) In 1993, more existing freeway miles were determined to be "urban" based on the results of the 1990 census, (2) new freeway miles were built, and (3) existing urban road miles were upgraded to "freeway" status. In 1995, Caltrans restructured district boundaries to match county lines. This change meant that some districts "lost" miles that were allocated to other districts. District 10 was most affected by this change.

Exhibit 2-4 illustrates the extent to which congestion is present on the state's freeway network. These results are calculated by taking the congested directional miles (Exhibit 2-2) and dividing them by the total directional miles (Exhibit 2-3).

Forty-three percent of the State's total urban freeway miles in 2003 were congested, which was the same percentage in 2002. Around 84 percent of District 12's urban freeway miles were congested in 2003, and 68 percent of District 11 urban freeway miles were congested. District 7's freeways are 60 percent congested. For each of the remaining districts, fewer than 40 percent of all urban miles were congested.

Exhibit 2-5 and Exhibit 2-6 display the delay and congested mile trends for each district. Exhibit 2-5 shows that District 7 leads the state in vehicle-hours of delay, but delay in District 4 grew rapidly between 1994 and 2000. District 4, however, has experienced a sharp decline in congestion since 2000.

Exhibit 2-6 shows District 7 accounting for the most congested directional miles with District 4 showing steady growth between 1994 and 2000. As with delay, District 4's congested directional miles has also declined. Congested miles in Districts 11 and 12 also have been growing rapidly over time.

As illustrated in Exhibit 2-7, statewide vehicle-hours of delay generally have been growing at a faster rate than congested directional miles since 1987. Since 2000, delay has declined while growth in congested miles has remained relatively flat.

Exhibit 2-8 shows how counties compare in 2002 and 2003 in terms of delay. The top-ten most congested counties remained largely unchanged since last year with Los Angeles, Orange, Alameda, San Diego, Santa Clara, and Riverside counties remaining the most congested. San Mateo County replaced San Bernardino County in the top ten. Stanislaus County moved up the most from 2002, climbing three places to become the 20th most congested county, with Ventura County dropping to 22nd.

Exhibit 2-9 shows approximate costs that congestion imposes on Californians (non-recurrent congestion is estimated to be equal to recurrent congestion). In 2003, delay is estimated to have cost California drivers and passengers nearly \$16 million per day in lost time and excess fuel consumption. This delay is estimated to have added just over 492 tons of emissions to the air, compared to what would have been emitted at uncongested speeds. These estimates are based on the most recently available data.

Exhibit 2-10 shows changes in annual vehicle miles traveled (VMT) from 1987 to 2003 on highways operated by the state. The latest year for which statewide VMT data is available was 2002.

Exhibit 2-1: Daily Vehicle-Hours of Delay by District 1987-2003

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 ⁺	1997 ⁺	1998 ⁺⁺	1999	2000	2001	2002	2003 ⁺⁺⁺	Percent of Statewide 2003
District 3	1,280	1,402	1,820	1,832	1,984	1,956	2,264	2,676	3,172	3,356	No Statewide Report Developed	7,809	8,907	10,896	16,200	14,872	13,226	3%
Annual % Change		10%	30%	1%	8%	-1%	16%	18%	19%	6%		53%	14%	22%	49%	-8%	-11%	
District 4 *	59,900	58,610	56,400	58,400	57,700	64,100	63,800	60,400	68,500	90,000		112,000	128,300	177,600	155,500	147,900	121,800	25%
Annual % Change		-2%	-4%	4%	-1%	11%	0%	-5%	13%	31%		12%	15%	38%	-12%	-5%	-18%	
District 5 *			610	680	1,400	1,480	1,530	880	n/a			2,020	2,598	5,154	6,016	5,937	6,453	1%
Annual % Change				11%	106%	6%	3%	-42%				23%	29%	98%	17%	-1%	9%	
District 6				118	257	280	276	222	223			75	257	334	522	508	507	0%
Annual % Change					118%	9%	-1%	-20%	0%			-31%	245%	30%	56%	-3%	0%	
District 7 **	76,405	87,532	137,397	137,915	139,006	123,048	114,808	128,780	132,162			142,857	128,623	166,294	165,861	165,861	178,491	36%
Annual % Change		15%	57%	0%	1%	-11%	-7%	12%	3%			3%	-10%	29%	0%	0%	8%	
District 8 ***	6,730	5,855	10,797	11,634	14,445	15,651	14,910	13,023	13,231			29,368	33,384	38,244	33,079	36,935	37,860	8%
Annual % Change		-13%	84%	8%	24%	8%	-5%	-13%	2%			30%	14%	15%	-14%	12%	3%	
District 10												2,711	3,292	3,930	3,340	4,127	4,064	1%
Annual % Change													21%	19%	-15%	24%	-2%	
District 11 ^	11,602	12,910	10,147	5,034	9,174	19,163	34,195	34,195	34,215			42,354	44,203	51,712	58,027	64,595	67,163	14%
Annual % Change		11%	-21%	-50%	82%	109%	78%	0%	0%			7%	4%	17%	12%	11%	4%	
District 12 ^^	30,945	30,945	30,945	30,945	33,137	36,723	64,007	64,148	63,973			78,906	78,796	71,286	66,522	71,376	62,468	13%
Annual % Change		0%	0%	0%	7%	11%	74%	0%	0%			7%	0%	-10%	-7%	7%	-12%	
Totals	186,862	197,254	248,116	246,558	257,103	262,401	295,790	304,324	315,476			418,100	428,360	525,450	505,068	512,112	492,032	100%
Annual % Change ⁺⁺		6%	26%	-1%	4%	2%	13%	3%	4%			10%	2%	23%	-4%	1%	-4%	

* - District 5 data from Santa Cruz were extracted from District 4 report in years prior to 1995 when the Santa Cruz area was a part of District 4. No 1995 data are available for District 5.

** - 2002-04 District 7 figures reflect more comprehensive coverage. Years 1999, 2000, 2001 revised based on updated analysis.

*** - District 8 began to use automatically collected data from freeway detectors on some District corridors in 2001.

^- District 11 began to use automatically collected data from freeway detectors on some District corridors in 1998. Results for 1993 are estimated.

^^ - No data were collected for District 12 prior to 1991. Amount shown is estimated for 1987 - 1990.

+ - No statewide report developed in 1996 and 1997. Some Districts developed internal reports in 1996.

++ - Year 1998 percent change is the annualized percent change for the missing years of data. It is not the total percent change between 1998 and the last year that congestion was monitored.

+++ - Districts 5 and 12 are estimated since these Districts did not perform data collection in 2003. Some congested segments were estimated in District 8 since data collection was not performed in some areas.

Exhibit 2-2: Urban Area Freeway Congested Directional Miles by District 1987-2003

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 ⁺	1997 ⁺	1998 ⁺⁺	1999	2000	2001	2002	2003 ⁺⁺⁺	Percent of Statewide 2003
District 3	28	23	24	50	39	41	53	54	55	60	No Statewide Report Developed	98	83	95	121	112	124	6%
Annual % Change		-18%	4%	108%	-22%	5%	29%	2%	2%	9%		28%	-15%	14%	28%	-8%	11%	
District 4 *	253	235	232	218	231	234	217	208	268	284		327	338	390	379	369	339	17%
Annual % Change		-7%	-1%	-6%	6%	1%	-7%	-4%	29%	6%		7%	3%	15%	-3%	-3%	-8%	
District 5 *			1	5	6	6	4	6	n/a			19	16	41	38	42	53	3%
Annual % Change				400%	20%	0%	-33%	50%				33%	-17%	159%	-6%	9%	28%	
District 6				6	10	13	12	11	13			2	13	9	20	16	23	1%
Annual % Change					67%	30%	-8%	-8%	18%			-49%	645%	-27%	113%	-17%	42%	
District 7 **	464	514	542	536	564	521	505	556	556			566	566	617	664	620	648	32%
Annual % Change		11%	5%	-1%	5%	-8%	-3%	10%	0%			1%	0%	9%	8%	-7%	5%	
District 8 ***	52	62	75	64	109	117	118	127	97			90	99	168	127	137	119	6%
Annual % Change		19%	21%	-15%	70%	7%	1%	8%	-24%			-3%	10%	71%	-25%	9%	-13%	
District 10											No Statewide Report Developed	19	27	20	51	51	46	2%
Annual % Change													39%	-27%	159%	1%	-9%	
District 11 ^	59	55	33	21	32	104	66	66	69			125	172	289	273	269	326	16%
Annual % Change		-7%	-40%	-36%	52%	225%	-37%	0%	5%			22%	38%	69%	-6%	-1%	21%	
District 12 ^^	127	127	127	127	127	189	150	138	133			204	295	269	254	326	326	16%
Annual % Change		0%	0%	0%	0%	49%	-21%	-8%	-4%			15%	45%	-9%	-6%	28%	0%	
Totals	983	1,016	1,034	1,027	1,118	1,225	1,125	1,166	1,191		No Statewide Report Developed	1,449	1,608	1,898	1,925	1,941	2,004	100%
Annual % Change ⁺⁺		3%	2%	-1%	9%	10%	-8%	4%	2%			7%	11%	18%	1%	1%	3%	

* - District 5 data from Santa Cruz were extracted from District 4 report in years prior to 1995 when the Santa Cruz area was a part of District 4. No 1995 data are available for District 5.

** - 2002-03 District 7 figures reflect more comprehensive coverage.

*** - District 8 began to use automatically collected data from freeway detectors on some District corridors in 2001.

^ - District 11 began to use automatically collected data from freeway detectors on some District corridors in 1998. Results for 1993 are estimated.

^^ - No data were collected for District 12 prior to 1991. Amount shown is estimated for 1987 - 1990.

+ - No statewide report developed in 1996 and 1997. Some Districts developed internal reports in 1996.

++ - Year 1998 percent change is the annualized percent change encompassing the missing years of data. It is not the total percent change between 1998 and the last year that congestion was monitored.

+++ - Mileage in Districts 5 and 12 are assumed to have not changed between 2002 and 2003 since these Districts did not perform data collection in 2003. Some congested segments were also assumed to not have changed in congested mileage in District 8 since data collection was not performed in some areas.

Exhibit 2-3: Urban Area Freeway Total Directional Miles by District 1987-2003

	1987	1988	1989	1990	1991	1992	1993 [^]	1994	1995 ^{^^}	1996	1997	1998	1999	2000	2001	2002	2003	Percent of Statewide 2003
District 3	288	288	288	291	291	291	319	319	319	319	319	319	319	317	317	320	325	7%
Annual % Change		0%	0%	1%	0%	0%	10%	0%	0%	0%	0%	0%	0%	-1%	0%	1%	2%	
District 4 *	933	933	944	942	950	943	973	1,000	1,064	1,064	1,064	1,075	1,075	1,074	1,074	1,074	1,104	24%
Annual % Change		0%	1%	0%	1%	-1%	3%	3%	6%	0%	0%	1%	0%	0%	0%	0%	3%	
District 5 *	170	170	170	170	170	170	185	185	226	226	226	226	226	226	226	226	229	5%
Annual % Change		0%	0%	0%	0%	0%	9%	0%	22%	0%	0%	0%	0%	0%	0%	0%	1%	
District 6	182	182	188	187	187	187	208	208	239	239	239	241	255	260	268	268	269	6%
Annual % Change		0%	3%	0%	0%	0%	11%	0%	15%	0%	0%	1%	6%	2%	3%	0%	0%	
District 7 **	1,000	1,000	998	998	997	996	1,059	1,059	1,059	1,059	1,059	1,061	1,061	1,065	1,065	1,075	1,085	23%
Annual % Change		0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	
District 8	361	361	383	376	381	381	480	486	523	526	526	542	542	542	555	572	572	12%
Annual % Change		0%	6%	-2%	1%	0%	26%	1%	8%	0%	0%	3%	0%	0%	2%	3%	0%	
District 10	199	199	207	205	206	206	268	269	170	170	178	178	178	178	182	182	185	4%
Annual % Change		0%	4%	-1%	0%	0%	30%	0%	-37%	0%	5%	0%	0%	0%	2%	0%	2%	
District 11	441	448	448	447	446	447	472	472	449	453	453	458	458	464	464	464	478	10%
Annual % Change		1%	0%	0%	0%	0%	6%	0%	-5%	1%	0%	1%	0%	1%	0%	0%	3%	
District 12 **	258	258	260	262	264	264	277	277	291	315	340	357	376	376	376	376	386	8%
Annual % Change		0%	1%	1%	1%	0%	5%	0%	5%	8%	8%	5%	5%	0%	0%	0%	3%	
Totals	3,832	3,838	3,885	3,878	3,893	3,884	4,242	4,275	4,340	4,370	4,403	4,457	4,489	4,503	4,527	4,557	4,634	100%
Annual % Change ⁺⁺		0%	1%	0%	0%	0%	9%	1%	2%	1%	1%	1%	1%	0%	1%	1%	2%	

Note: Directional Urban Freeway Miles from the Caltrans Traffic Accident Surveillance and Analysis System (TASAS) highway inventory.

* - District 5 data from Santa Cruz were extracted from District 4 report in years prior to 1995 when the Santa Cruz area was a part of District 4.

** - 1987 District 7 and District 12 data estimated because District 12 was a part of District 7 until 1988.

[^] - Urban/ rural boundaries were updated to reflect urbanized areas identified in the 1990 census. This accounts for the relatively large increase in miles in 1993.

^{^^} - In 1995, District boundaries were adjusted to follow county lines.

Exhibit 2-4: Congested Directional Miles to Total Directional Miles by District 1987-2003

	1987	1988	1989	1990	1991	1992	1993 ⁺	1994	1995 ⁺	1996 ⁺⁺	1997 ⁺⁺	1998	1999	2000	2001	2002	2003 ⁺⁺⁺
District 3	10%	8%	8%	17%	13%	14%	17%	17%	17%	19%	No Statewide Report Developed	31%	26%	30%	38%	35%	38%
District 4 *	27%	25%	25%	23%	24%	25%	22%	21%	25%	27%		30%	31%	36%	35%	34%	31%
District 5 *			1%	3%	4%	4%	2%	3%	n/a			8%	7%	18%	17%	18%	23%
District 6				3%	5%	7%	6%	5%	5%			1%	5%	4%	7%	6%	9%
District 7 **	46%	51%	54%	54%	57%	52%	48%	53%	53%			53%	53%	58%	62%	58%	60%
District 8 ***	14%	17%	20%	17%	29%	31%	25%	26%	19%			17%	18%	31%	23%	24%	21%
District 10												11%	15%	11%	28%	28%	25%
District 11 ^	13%	12%	7%	5%	7%	23%	14%	14%	15%			27%	38%	62%	59%	58%	68%
District 12 ^^	49%	49%	49%	49%	48%	72%	54%	50%	46%			57%	79%	71%	68%	87%	84%
Totals	26%	26%	27%	26%	29%	32%	27%	27%	27%			33%	36%	42%	43%	43%	43%

Note: Directional Urban Freeway Miles from the Caltrans Traffic Accident Surveillance and Analysis System (TASAS) highway inventory.

* - District 5 data from Santa Cruz were extracted from District 4 report in years prior to 1995 when the Santa Cruz area was a part of District 4. No 1995 data are available for District 5.

** - 2002 District 7 figures reflect more comprehensive coverage.

*** - District 8 began to use automatically collected data from freeway detectors on some District corridors in 2001.

^ - District 11 began to use automatically collected data from freeway detectors on some District corridors in 1998. Results for 1993 are estimated.

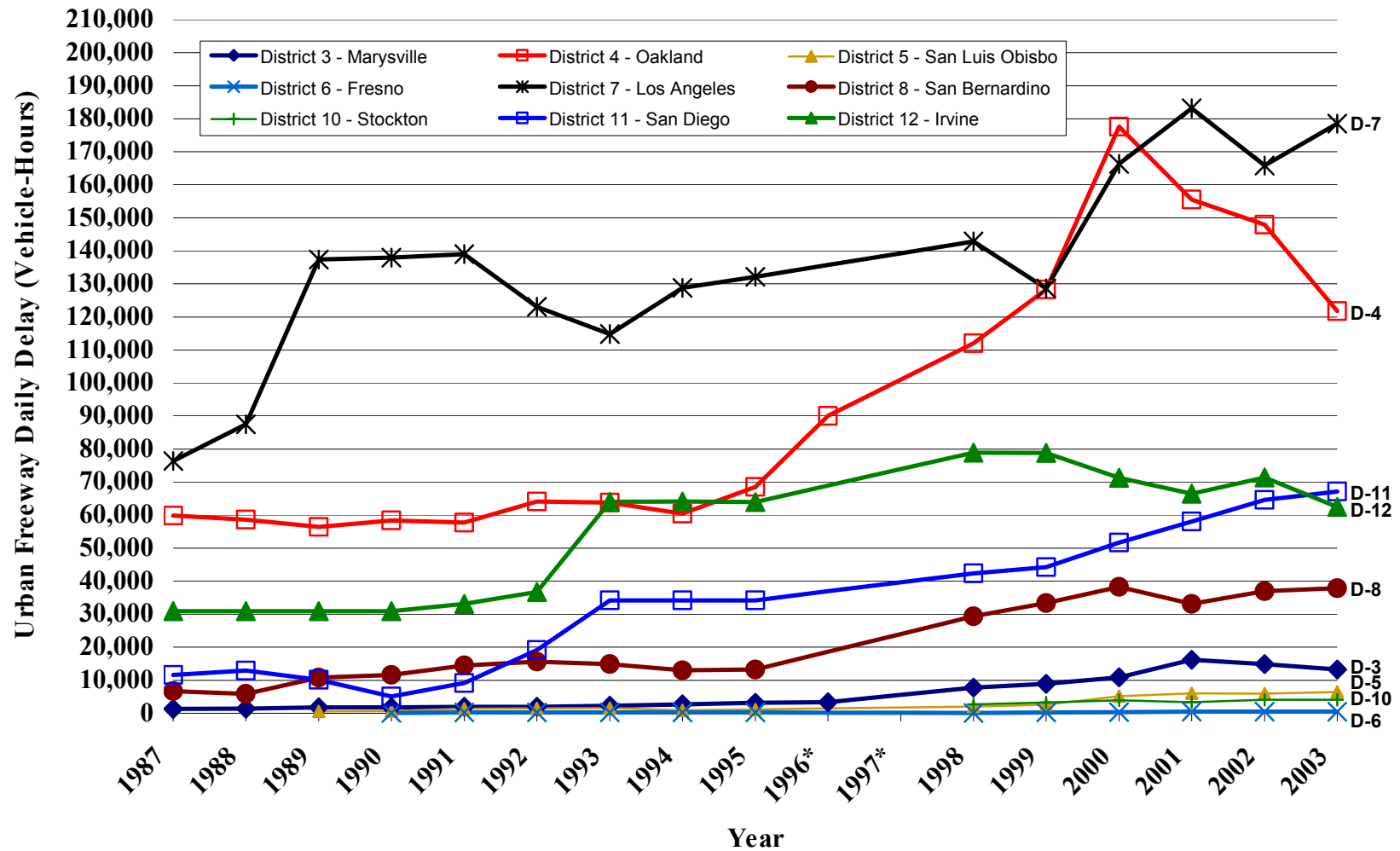
^^ - No data were collected for District 12 prior to 1991. Amount shown is estimated for 1987 - 1990.

+ - Dramatic changes in percentages may be due in part to changes in "urban" boundaries or in changes in District boundaries.

++ - No statewide report developed in 1996 and 1997. Some Districts developed internal reports in 1996.

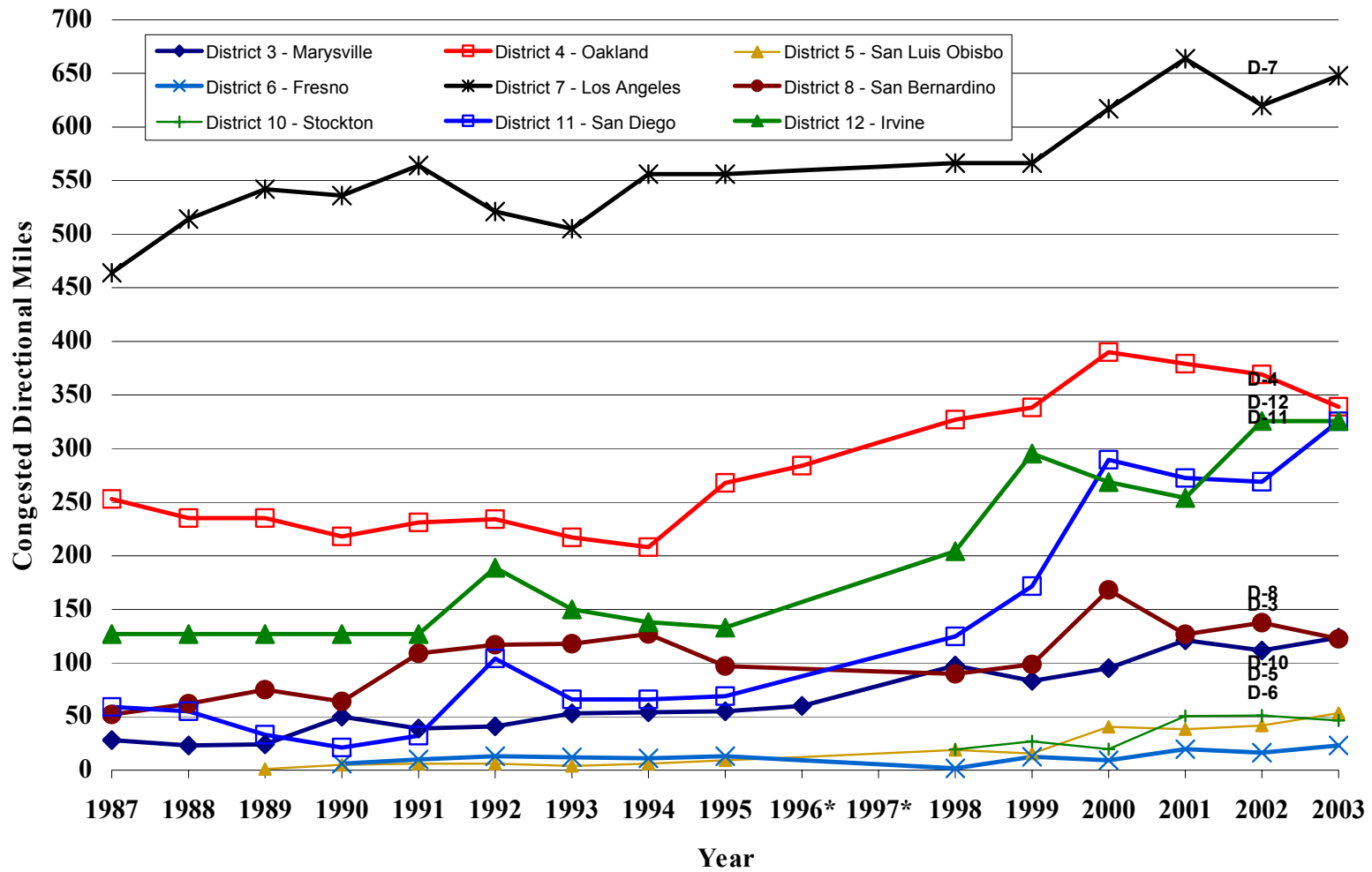
+++ - Mileage in Districts 5 and 12 are assumed to have not changed between 2002 and 2003 since these Districts did not perform data collection in 2003. Some congested segments were also assumed to not have changed in congested mileage in District 8 since data collection was not performed in some areas.

Exhibit 2-5: Daily Vehicle Hours of Delay Trends by District 1987-2003



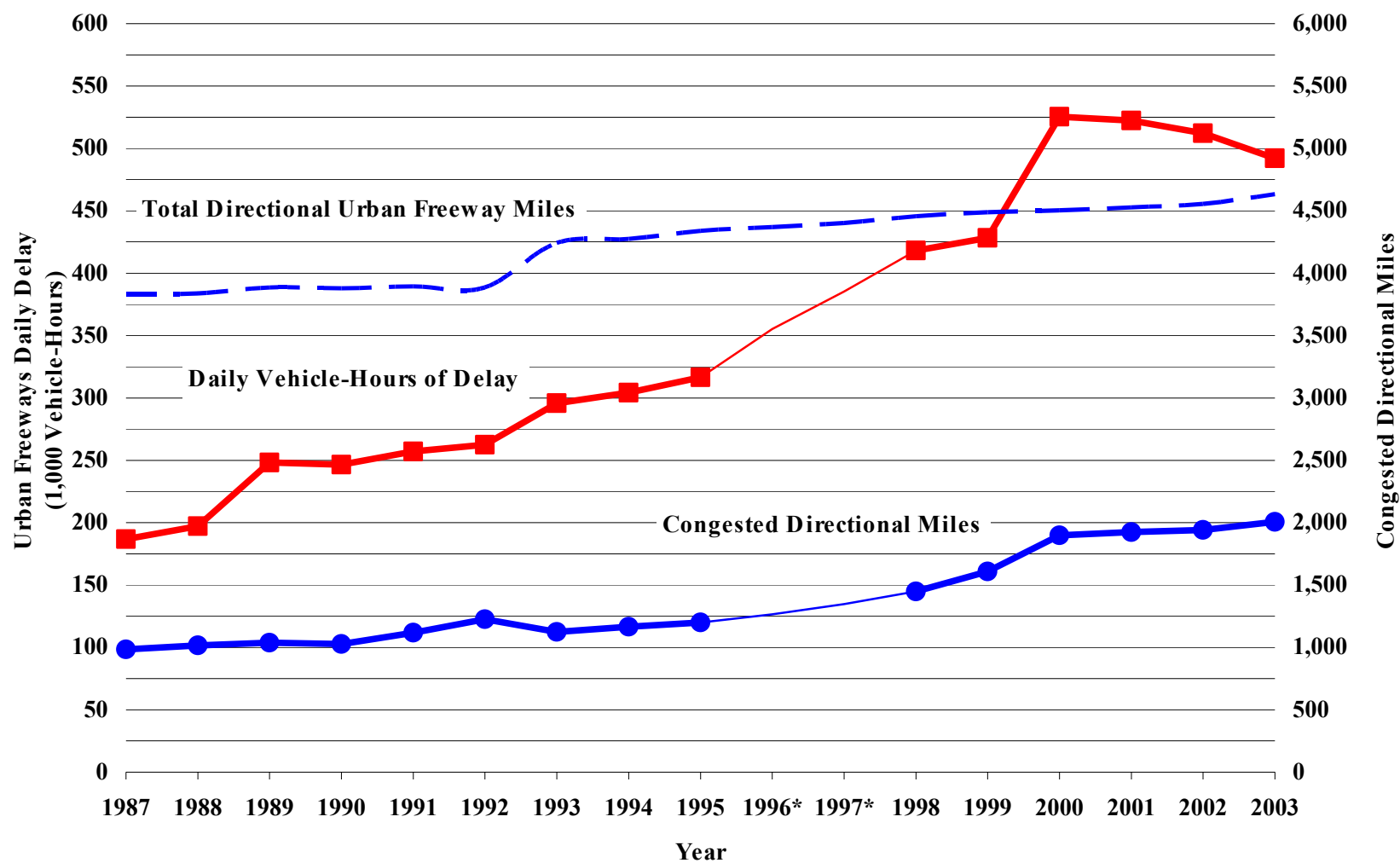
*- No statewide report was developed in 1996 and 1997. Internal district data were used where available for these years. District 7 numbers for 2000 were revised based on an updated analysis.

Exhibit 2-6: Congested Directional Mile Trends by District 1987-2003



*- No statewide report was developed in 1996 and 1997. Internal district data were used where available for these years. District 7 numbers for 2000 were revised based on an updated analysis.

Exhibit 2-7: Statewide Vehicle-Hours of Delay and Congested Directional Miles 1987-2003



*- No statewide report was developed in 1996 and 1997. Internal district data were used where available for these years. District 7 numbers for 2000 were revised based on an updated analysis.

Exhibit 2-8: Daily Delay and Congested Directional Miles County Rankings 2002-2003

Rank		Caltrans District	County	Daily Vehicle-Hours of Delay		Congested Directional Miles	
2003	2002			2003	2002	2003	2002
1	1	7	Los Angeles	178,220	165,474	638.4	612.0
2	3	11	San Diego	67,163	64,595	325.5	269.0
3	2	12	Orange	62,468	71,376	325.6	325.6
4	4	4	Alameda	46,300	61,300	98.0	101.0
5	6	8	Riverside	30,606	26,549	72.5	74.8
6	5	4	Santa Clara	24,300	31,600	75.0	87.0
7	7	4	Contra Costa	18,700	19,400	58.0	59.0
8	8	3	Sacramento	11,774	13,716	103.3	101.8
9	9	4	San Francisco	11,200	11,400	23.0	24.0
10	12	4	San Mateo	7,300	7,700	30.0	33.0
11	10	8	San Bernardino	7,254	10,386	46.8	62.6
12	11	4	Marin	6,200	8,400	20.0	21.0
13	13	4	Sonoma	5,200	4,400	23.0	25.0
14	16	5	Santa Cruz	4,030	3,578	17.9	17.9
15	14	10	San Joaquin	3,635	4,085	40.3	46.8
16	15	4	Solano	2,600	3,700	12.0	19.0
17	17	5	Santa Barbara	2,110	2,069	25.1	16.4
18	18	3	Placer	1,398	920	10.3	6.1
19	19	6	Fresno	484	508	21.7	16.2
20	23	10	Stanislaus	429	41	6.2	4.0
21	21	5	Monterey	280	273	5.3	5.3
22	20	7	Ventura	270	387	9.5	8.0
23	22	3	El Dorado	34	236	4.1	3.7
24	24	5	San Luis Obispo	33	17	4.9	2.0
25	25	6	Kern	23	0	1.3	0.0
26	25	3	Yolo	20	0	6.0	0.0
Totals				492,032	512,112	2,004	1,941

Exhibit 2-9: 2003 Excess Fuel Consumption, Travel Cost, & Emissions Due to Congestion

District	3	4	5	6	7	8	10	11	12	Total
Indicator										
Total Daily Delay (Vehicle-Hours) *	26,452	243,600	12,907	1,014	356,981	75,720	8,128	134,326	124,936	984,064
Average Vehicle Occupancy **	1.00	1.10	1.00	1.10	1.10	1.10	1.10	1.00	1.10	
Estimated Daily Person-Hours of Delay**	26,452	267,960	12,907	1,115	392,680	83,292	8,941	134,326	137,429	1,065,102
Excess Fuel Consumed per Day (Gallons) ***	45,471	418,748	22,187	1,743	613,651	130,163	13,973	230,906	214,764	1,691,606
Total User Cost per Day (Dollars) ^	\$402,758	\$4,001,855	\$196,517	\$16,656	\$5,864,482	\$1,243,932	\$133,533	\$2,045,239	\$2,052,439	\$15,957,410
Total Emissions per Day (Tons) ***	13	122	6	0.5	178	38	4	67	62	492

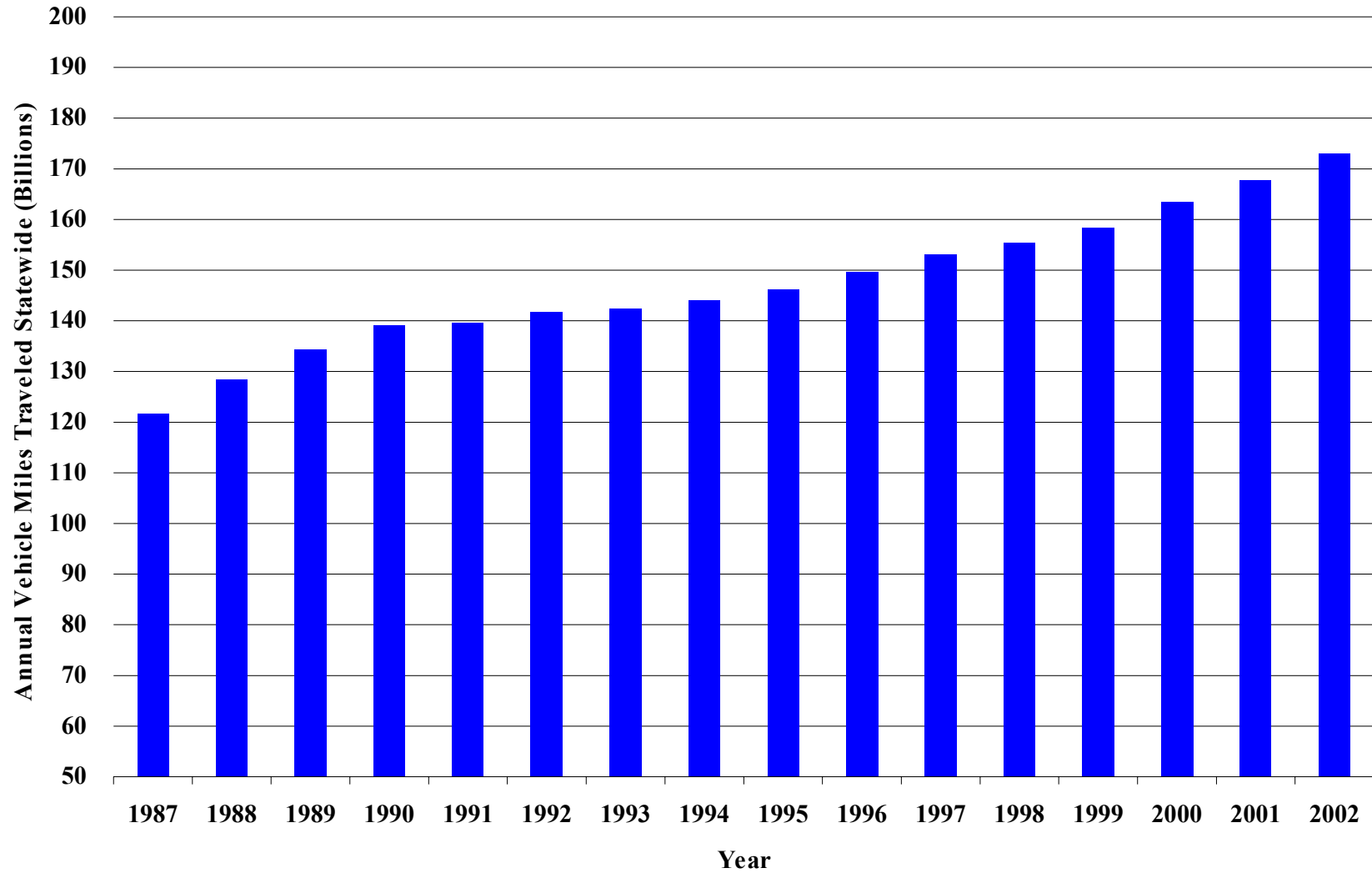
* - Recurrent congestion is a condition that occurs when operating speeds on the freeway remain below 35 MPH for 15 minutes or more on a typical incident-free weekday. Nonrecurrent congestion is congestion caused by incidents and special events, and is estimated to be equal to recurrent congestion. Therefore, total daily delay is double the non-recurrent congestion reported in the HICOMP report.

** - Average Vehicle Occupancy (AVO) estimates are used to calculate the daily person-hours of delay (Total Daily Delay x AVO). The person-hours of daily delay estimates are then used to calculate the total user cost per day. AVOs used in the HICOMP are the "home-to-work" trip estimates from the 2000-2001 California Statewide Household Travel Survey. Caltrans, June 2002.

*** - Fuel Efficient Traffic Signal Management Evaluation (Institute of Transportation Studies): 1,000 vehicle-hours of delay results in 1,719 gallons of wasted fuel and 1/2 ton of emissions.

^ - Total user cost includes cost of travel time and cost of excess fuel. The average cost of travel time per person-hour of delay in 2003 is estimated to be \$12.02. This figure is based on the average auto and truck costs of travel from the California Lifecycle Benefit/Cost Analysis Model. The cost of fuel is estimated at \$1.87 per gallon, the average monthly price (weighted by monthly "vehicle miles traveled" estimates from Caltrans) for regular unleaded gasoline as reported by the California State Automobile Association (CSAA) monthly gas survey for the Year 2003.

Exhibit 2-10: California State Highway Vehicle Miles Traveled (VMT) 1987-2003



Source: Division of Traffic Operations, Traffic and Vehicle Data Systems Unit (<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/monthly/histdata.pdf>)

3. District Level Findings and Analysis

This chapter presents the 2003 findings by Caltrans District. The results are presented in three formats: A district summary table presents total district-wide delay, congested directional miles, and county sub-totals. A chart shows the district trends over time for delay and congested miles. Finally, two maps are presented. These maps show the location and duration of freeway segments where congested was measured. The first map shows congested locations for the AM peak commute period, and the second maps shows the results for the PM peak commute period.

3.1 District 3: Sacramento Area

Exhibit 3-1 summarizes weekday recurrent congestion in District 3 during 2003 compared to 2002. Exhibit 3-2 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-3 and 3-4 are maps showing the location and duration of AM and PM period congestion.

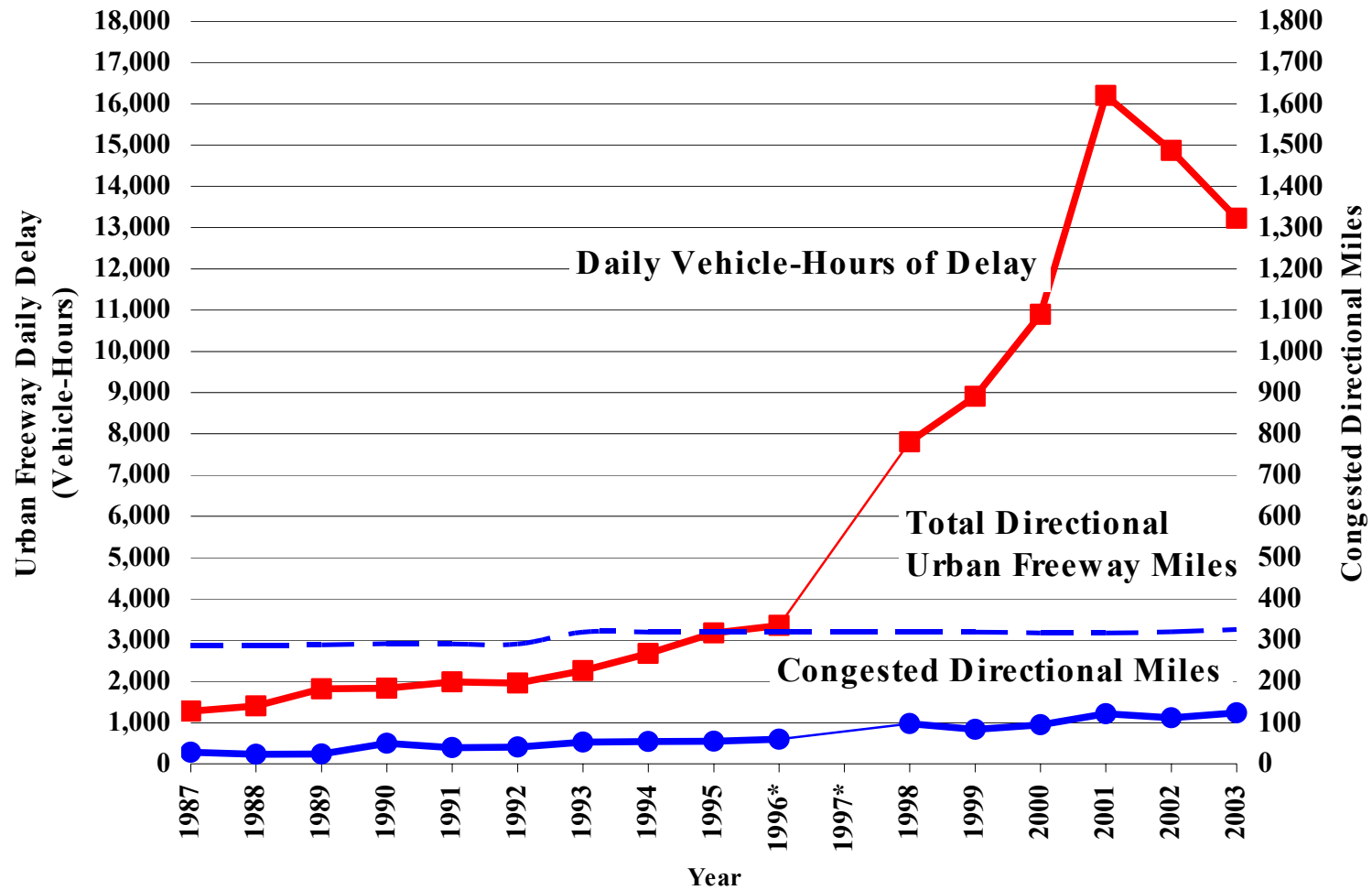
Both the 2002 and 2003 data used in this statewide congestion monitoring report are based on the fall tachometer data collection efforts. Prior to 1998, delay estimates were based on both spring and fall tachometer data.

In 2003, the total vehicle-hours of delay per day (vhdpd) were 13,226, compared to 14,872 reported for 2002 (an 11 percent decrease). Congested directional miles (cdm) were nearly 124 miles in 2003, an 11 percent increase over the 112 miles reported in 2002.

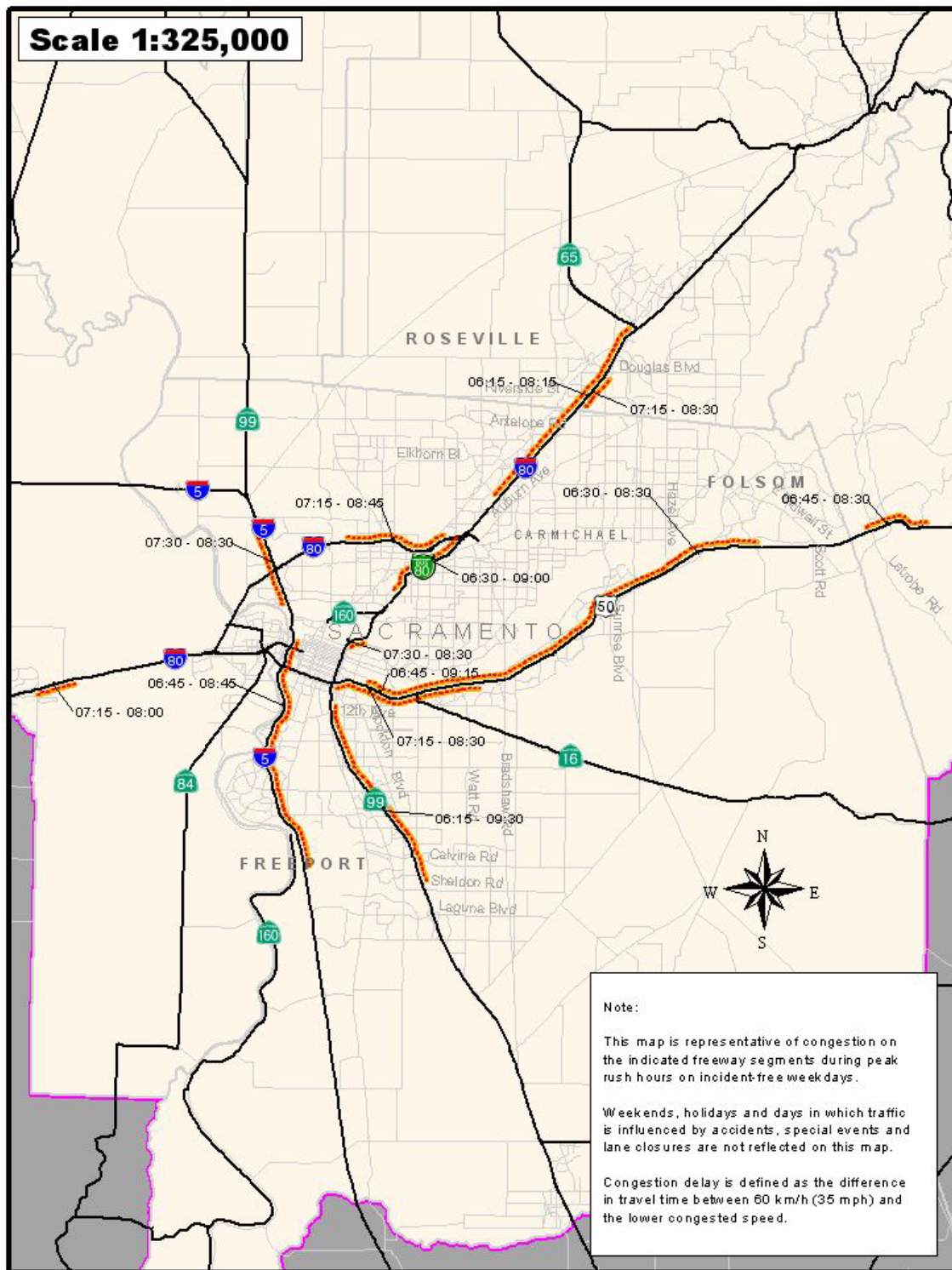
Exhibit 3-1: District 3 Highway Congestion Summary

District 3	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	14,872	13,226	-11%	3%
El Dorado	236	35	-85%	
Placer	920	1,663	81%	
Sacramento	13,716	11,509	-16%	
Yolo	-	20	n/ a	
Congested Directional Miles	111.6	123.7	11%	6%
El Dorado	3.7	4.0	9%	
Placer	6.1	9.8	61%	
Sacramento	101.8	103.9	2%	
Yolo	-	6.0	n/ a	
Total Urban Area Freeway Directional Miles	319.8	325.4		
Congested Miles/ Total Urban Freeway Miles	35%	38%		

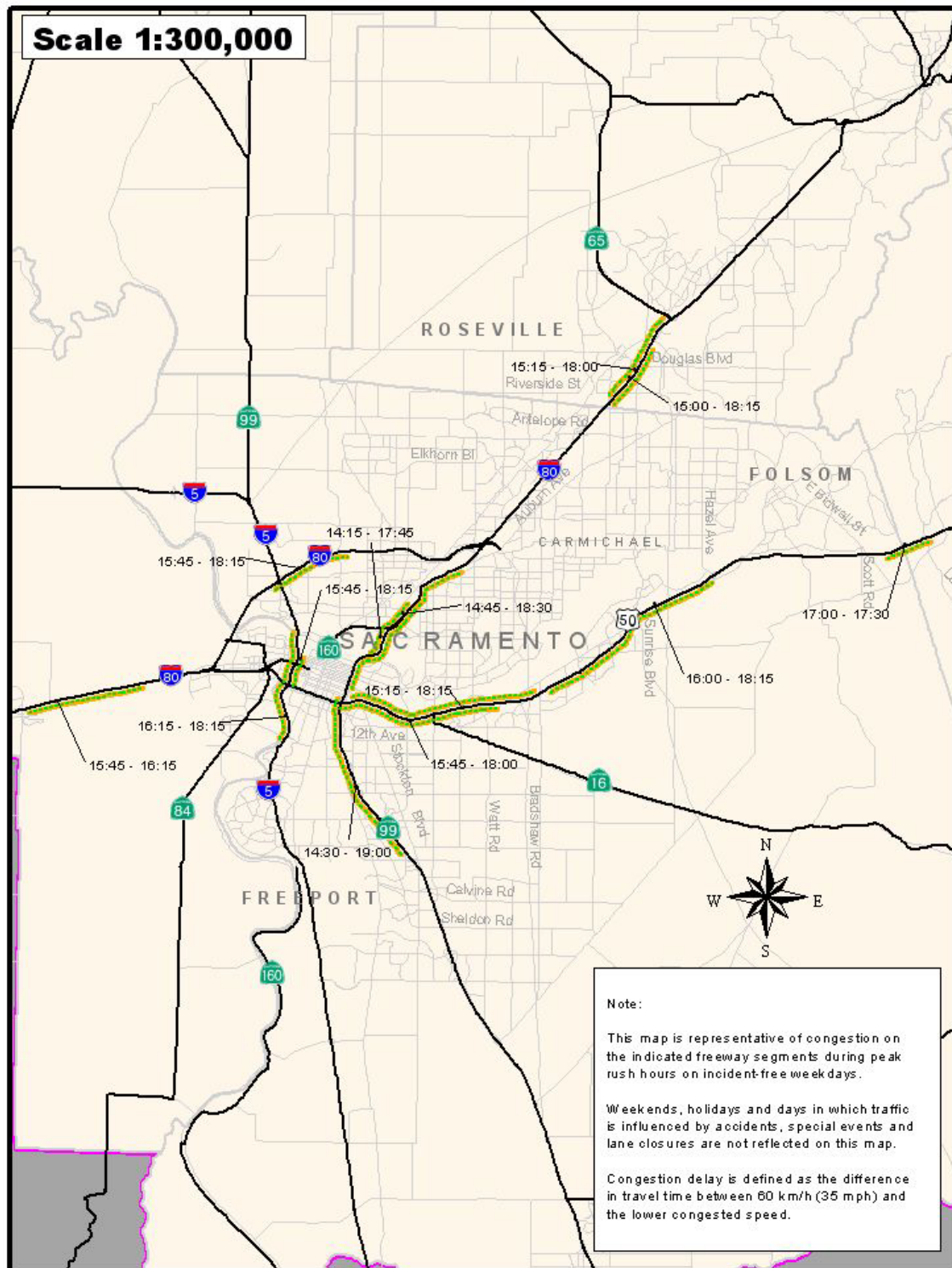
Exhibit 3-2: District 3 Congestion Trends 1987-2003



* - No statewide report developed in 1996 or 1997. District 3 developed an internal report in 1996.



**EXHIBIT 3-3
DISTRICT 3
SACRAMENTO AREA
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-4
DISTRICT 3
SACRAMENTO AREA
2003 P. M. CONGESTION MAP**

3.2 District 4: San Francisco Bay Area

Exhibit 3-5 summarizes weekday recurrent congestion in District 4 during 2003 compared to 2002. Exhibit 3-6 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-7 and 3-8 are maps showing the location and duration of AM and PM period congestion.

District 4 collects data in both the spring and fall seasons for the statewide HICOMP report.

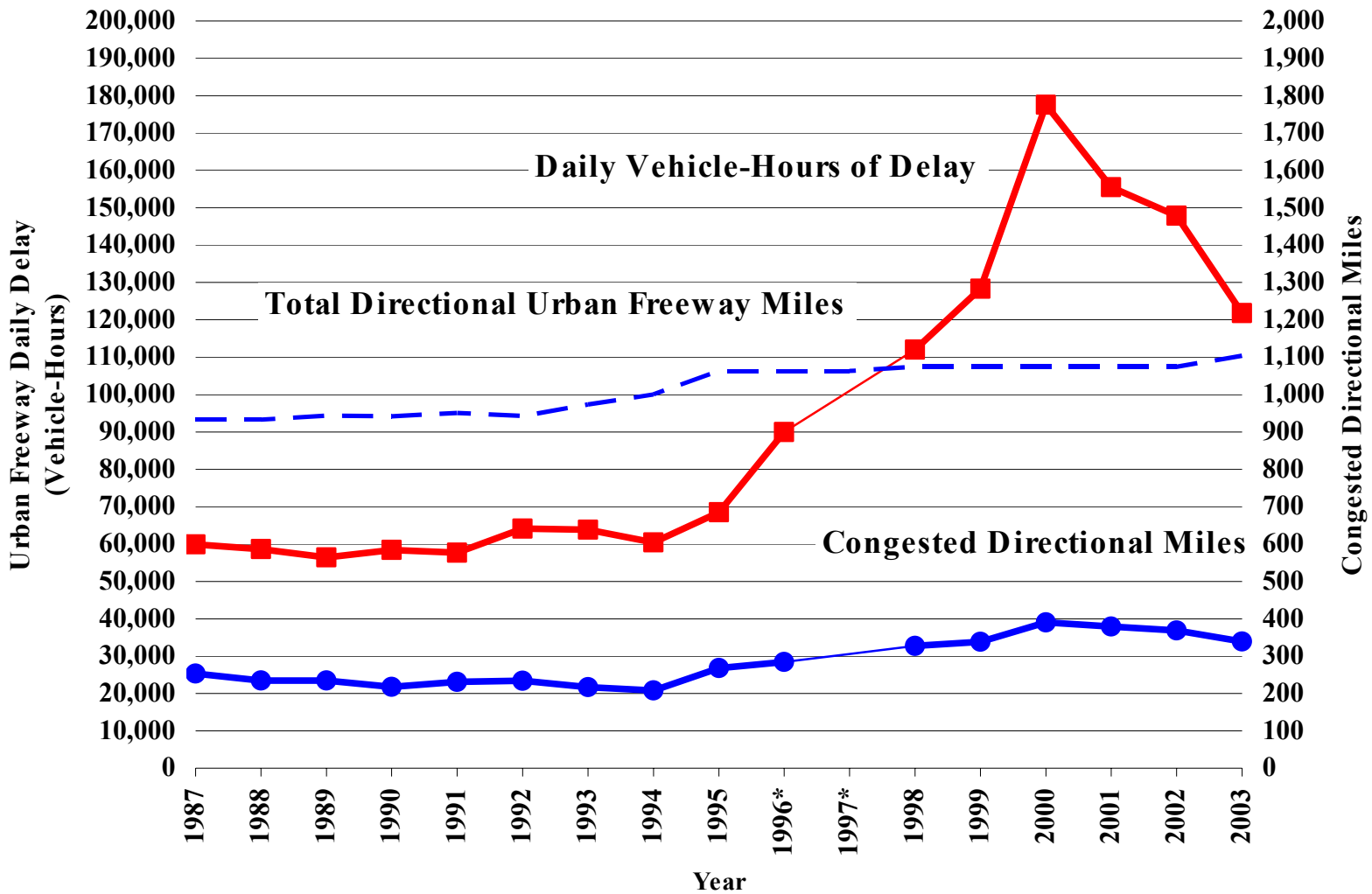
In 2003, the total vehicle-hours of delay per day (vhdpd) were 121,800 compared to 147,900 reported for 2002 (an 18 percent decrease). Congested directional miles (cdm) were 339 miles in 2003, down eight percent from 2002.

Exhibit 3-5: District 4 Highway Congestion Summary

District 4	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	147,900	121,800	-18%	25%
Alameda	61,300	46,300	-24%	
Contra Costa	19,400	18,700	-4%	
Marin	8,400	6,200	-26%	
Napa	-	-	n/ a	
San Francisco	11,400	11,200	-2%	
San Mateo	7,700	7,300	-5%	
Santa Clara	31,600	24,300	-23%	
Solano	3,700	2,600	-30%	
Sonoma	4,400	5,200	18%	
Congested Directional Miles	369.0	339.0	-8%	17%
Alameda	101.0	98.0	-3%	
Contra Costa	59.0	58.0	-2%	
Marin	21.0	20.0	-5%	
Napa	-	-	n/ a	
San Francisco	24.0	23.0	-4%	
San Mateo	33.0	30.0	-9%	
Santa Clara	87.0	75.0	-14%	
Solano	19.0	12.0	-37%	
Sonoma	25.0	23.0	-8%	
Total Urban Area Freeway Directional Miles	1,074.4	1,104.3		
Congested Miles/ Total Urban Freeway Miles	34%	31%		

Note: County numbers may not sum to District totals due to rounding.

Exhibit 3-6: District 4 Congestion Trends 1987-2003



* - No statewide report in 1996 or 1997. District 4 developed an internal report in 1996.



**EXHIBIT 3-7
DISTRICT 4
SAN FRANCISCO BAY AREA
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-8
DISTRICT 4
SAN FRANCISCO BAY AREA
2003 P.M. CONGESTION MAP**

3.3 District 5: Central Coast Area

Exhibit 3-9 summarizes weekday recurrent congestion in District 5 during 2003 compared to 2002. Exhibit 3-10 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-11 and 3-12 are maps showing the location and duration of AM and PM period congestion.

The 2002 data used in this statewide congestion monitoring report were based on fall data collection. In 2003, tachometer data collection was not performed due to resource limitations. The 2003 delay results were estimated using a combination of population projections and other local sources.

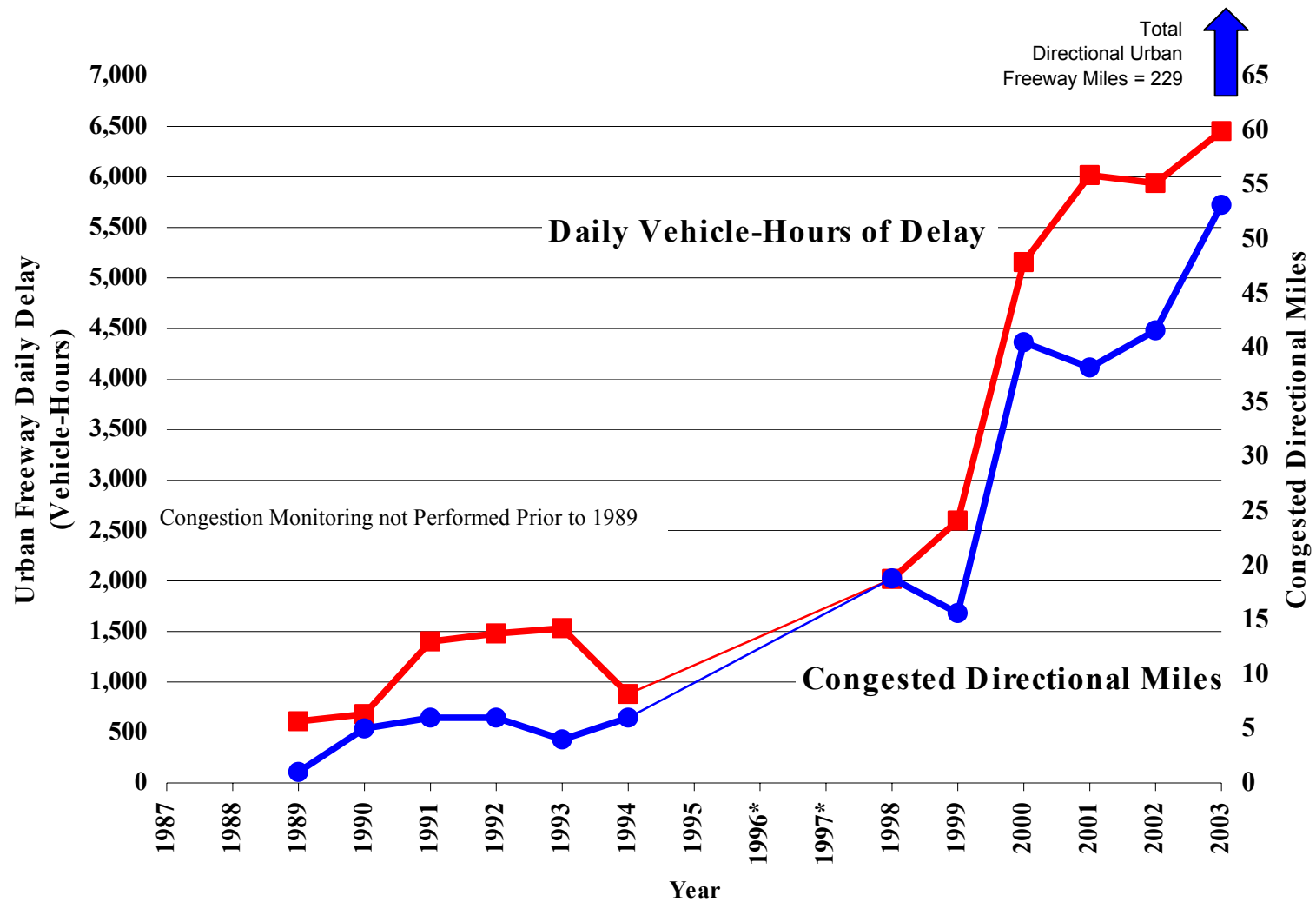
In 2003, the total vehicle-hours of delay per day (vhdpd) were estimated to be 6,453, compared to 5,937 reported for 2002, a nine percent increase. Congested directional miles (cdm) were estimated to be around 53 miles in 2003, a 28 percent increase.

Exhibit 3-9: District 5 Highway Congestion Summary

District 5	2002	2003*	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	5,937	6,453	9%	1%
Monterey	273	280	3%	
San Luis Obispo	17	33	96%	
Santa Barbara	2,069	2,110	2%	
Santa Cruz	3,578	4,030	13%	
Congested Directional Miles	41.6	53.1	28%	3%
Monterey	5.3	5.3	0%	
San Luis Obispo	2.0	4.9	144%	
Santa Barbara	16.4	25.1	53%	
Santa Cruz	17.9	17.9	0%	
Total Urban Area Freeway Directional Miles	226.0	229.1		
Congested Miles/ Total Urban Freeway Miles	18%	23%		

* - Daily vehicle hours of delay and congested directional miles in 2003 were estimated.

Exhibit 3-10: District 5 Congestion Trends 1989-2003



* - No statewide report developed in 1996 or 1997.

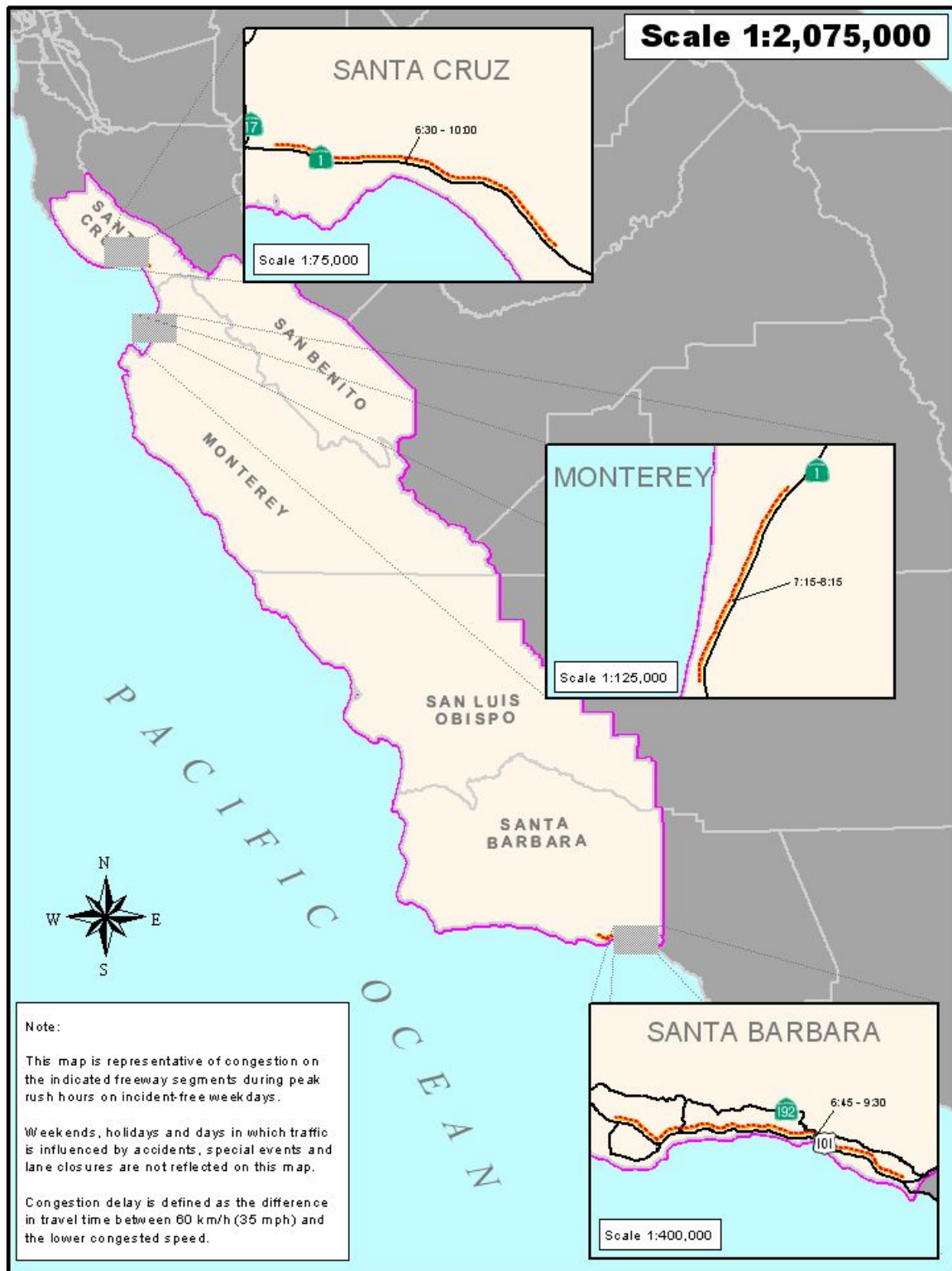
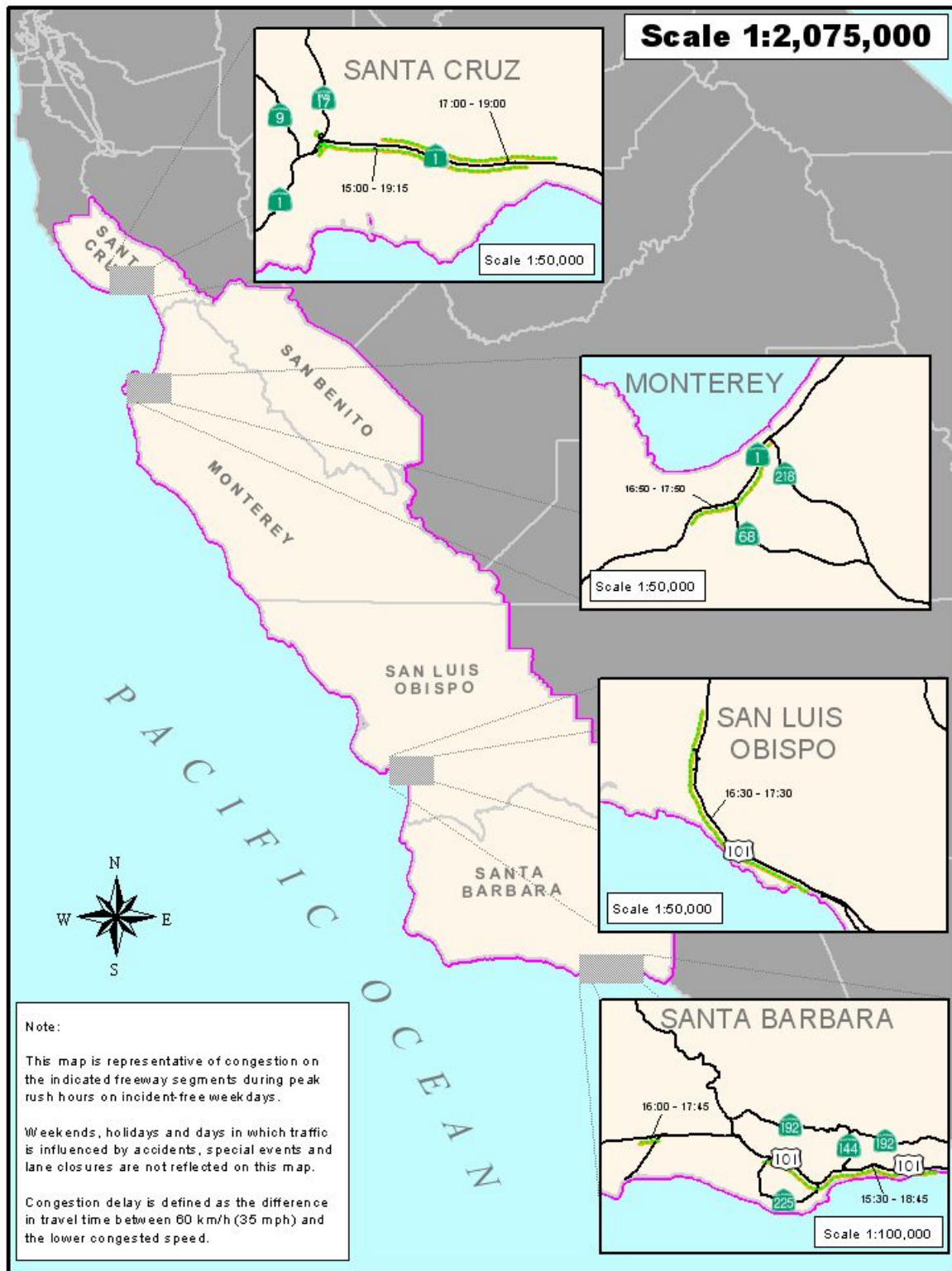


EXHIBIT 3-11
DISTRICT 5
CENTRAL COAST AREA
2003 A.M. CONGESTION MAP



**EXHIBIT 3-12
 DISTRICT 5
 CENTRAL COAST AREA
 2003 P.M. CONGESTION MAP**

3.4 District 6: Fresno Area

Exhibit 3-13 summarizes weekday recurrent congestion in District 6 during 2003 compared to 2002. Exhibit 3-14 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-15 and 3-16 are maps showing the location and duration of AM and PM period congestion.

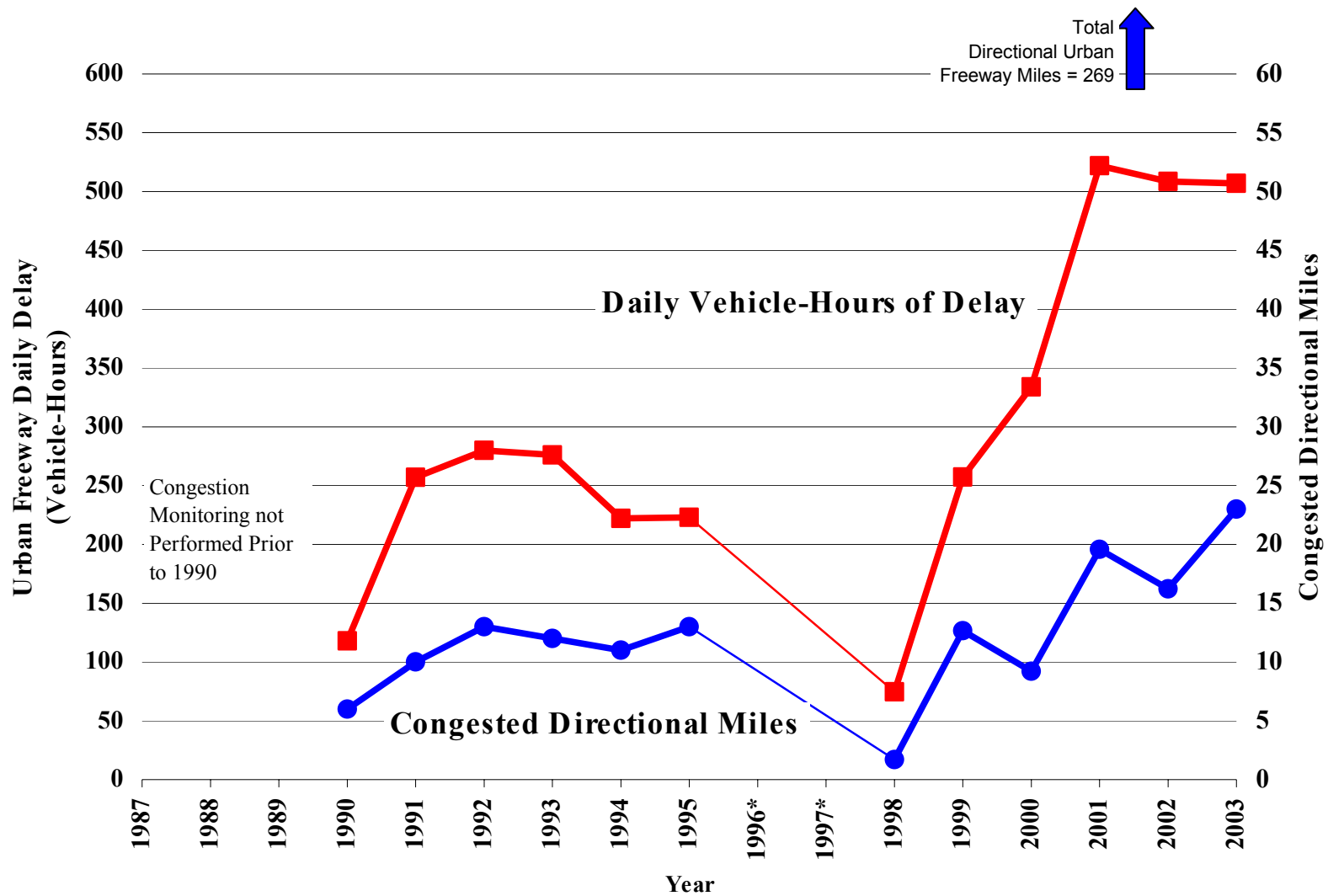
The 2002 and 2003 District 6 results in this report are based on tachometer data collected in both the fall and spring seasons. Between 1998 and 2001, delay estimates were based on fall tachometer data only.

In 2003, the total vehicle-hours of delay per day (vhdpd) were 507 compared to the 508 hours reported for 2002. Congested directional miles (cdm) were just over 23 miles in 2003, a 7-mile increase from the 16 miles reported in 2002. District 6's VHDPD and CDM numbers were relatively small to begin with. Therefore, any small change for 2003 may translate to large percentage increases.

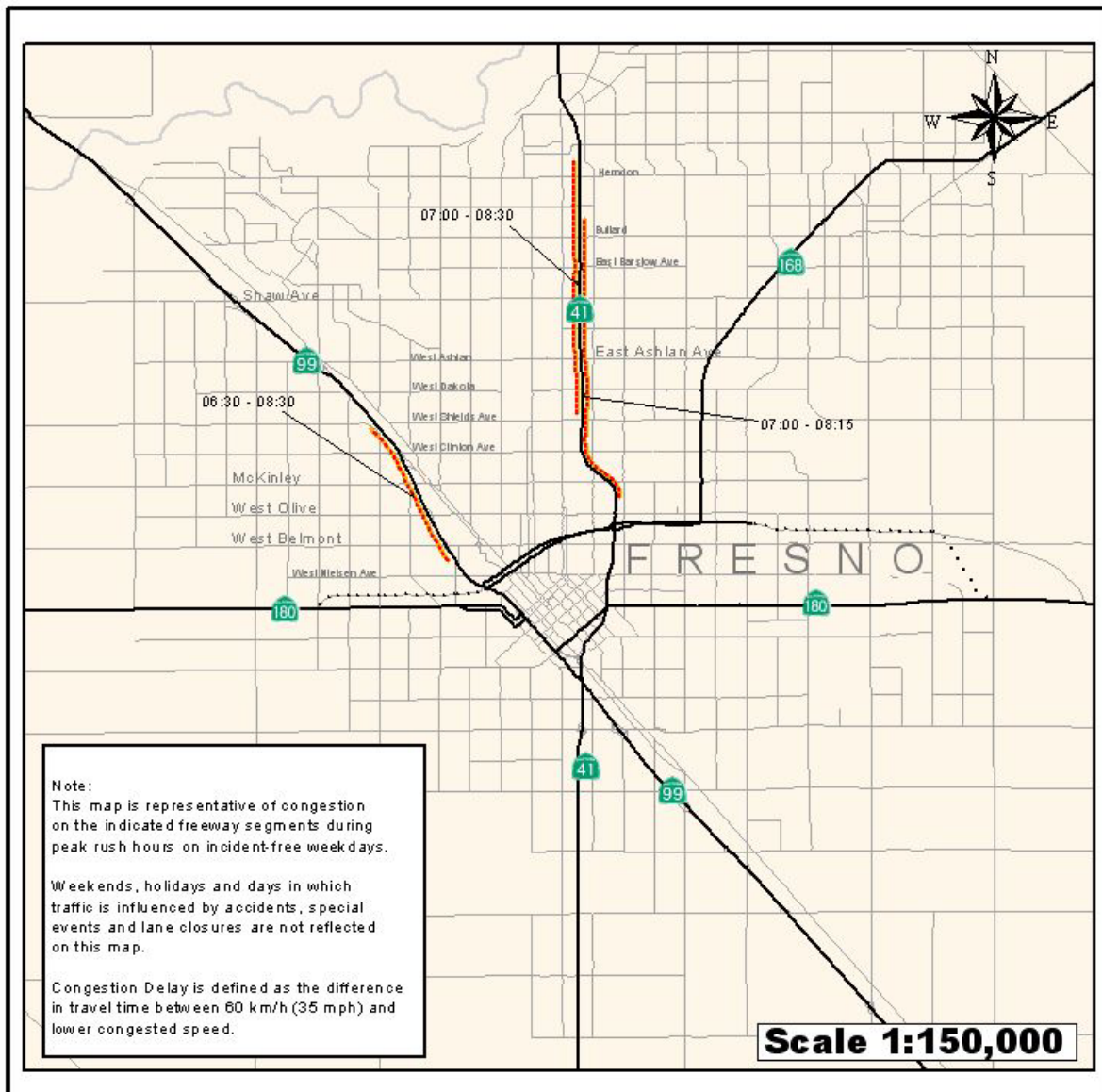
Exhibit 3-13: District 6 Highway Congestion Summary

District 6	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	508	507	0%	0%
Fresno Kern	508 -	484 23	-5% n/ a	
Congested Directional Miles	16.2	23.0	42%	1%
Fresno Kern	16.2 -	21.7 1.3	34% n/ a	
Total Urban Area Freeway Directional Miles	268.0	269.1		
Congested Miles/ Total Urban Freeway Miles	6%	9%		

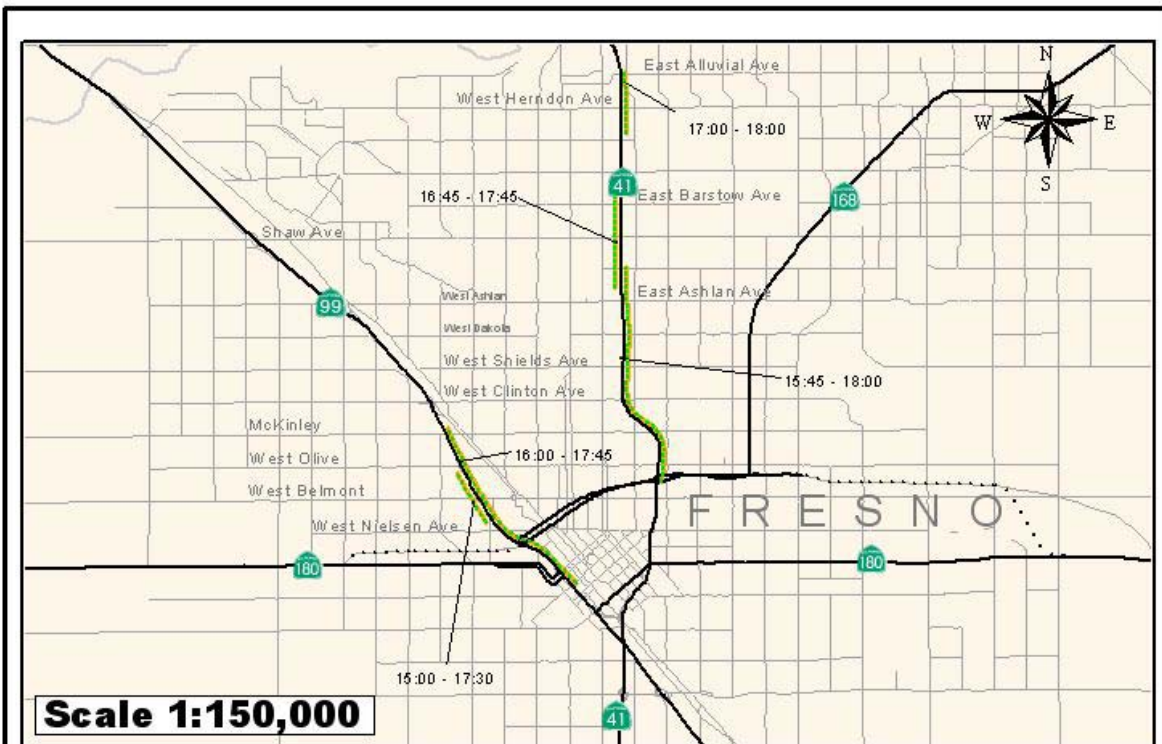
Exhibit 3-14: District 6 Congestion Trends 1990-2003



* - No statewide report developed in 1996 or 1997.



**EXHIBIT 3-15
 DISTRICT 6
 FRESNO AREA
 2003 A.M. CONGESTION MAP**



**EXHIBIT 3-16
DISTRICT 6
FRESNO AREA
2003 P.M. CONGESTION MAP**

3.5 District 7: Los Angeles-Ventura Area

Exhibit 3-17 summarizes weekday recurrent congestion in District 7 during 2003 compared to 2002. Exhibit 3-18 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-19 and 3-20 are maps showing the location and duration of AM and PM period congestion.

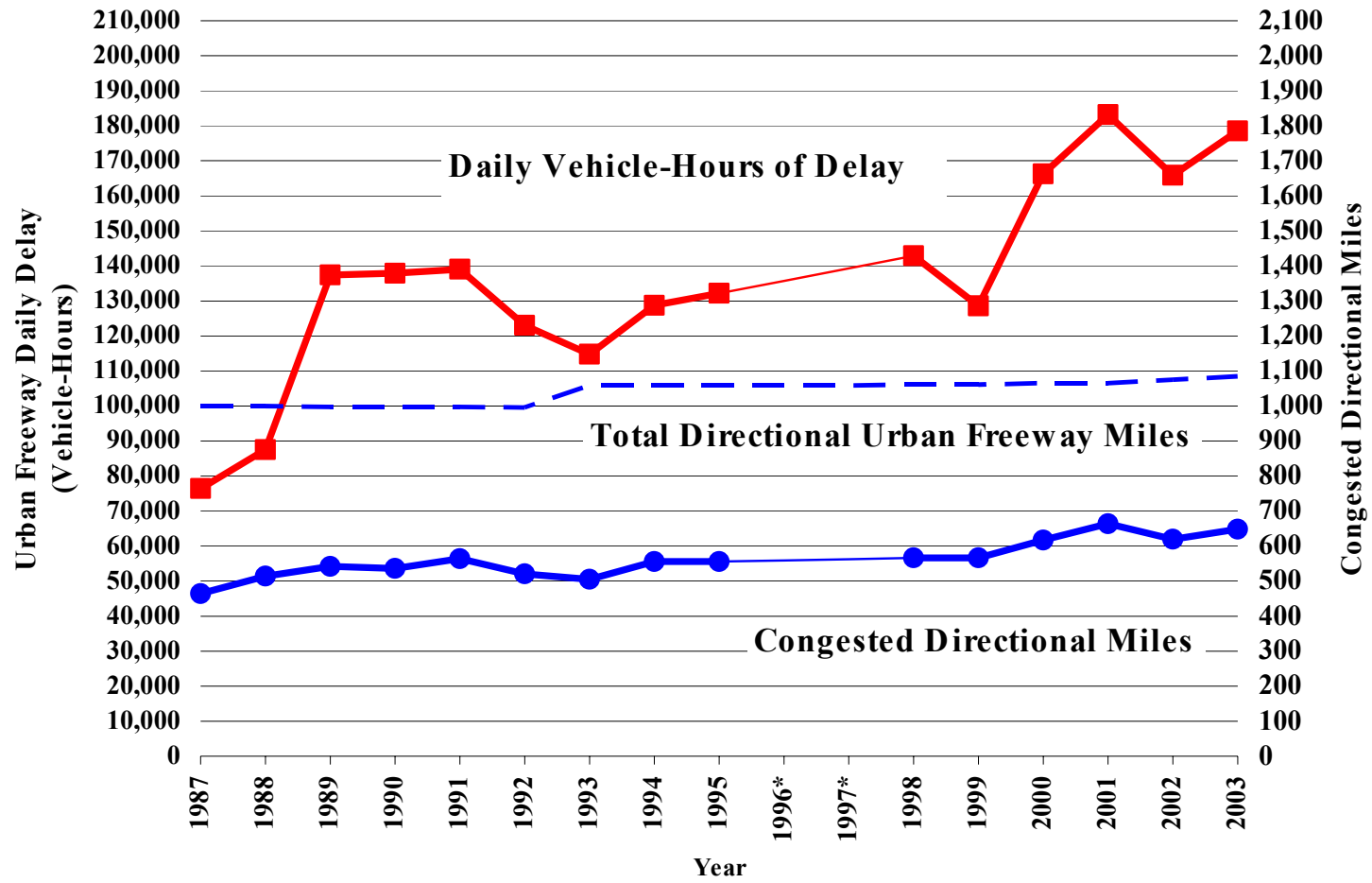
Both the 2002 and 2003 data used in this statewide congestion monitoring report are based on fall data collection efforts only. Prior to 1998, delay estimates were based on both spring and fall loop detector data.

In 2003, the total vehicle-hours of delay per day (vhdpd) were 178,491 compared to 165,861 hours reported for 2002 (an eight percent increase). Congested directional miles (cdm) were nearly 648 miles in 2003, an increase of five percent from 2002.

Exhibit 3-17: District 7 Highway Congestion Summary

District 7	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	165,861	178,491	8%	36%
Los Angeles	165,474	178,220	8%	
Ventura	387	270	-30%	
Congested Directional Miles	620.0	647.9	5%	32%
Los Angeles	612.0	638.4	4%	
Ventura	8.0	9.5	19%	
Total Urban Area Freeway Directional Miles	1,074.8	1,084.8		
Congested Miles/ Total Urban Freeway Miles	58%	60%		

Exhibit 3-18: District 7 Congestion Trends 1987-2003



* - No statewide report developed in 1996 or 1997.

Scale 1:300,000

EXHIBIT 3-19
DISTRICT 7
LOS ANGELES-VENTURA AREA
2003 A.M. CONGESTION MAP



Note:

This map is representative of congestion on the indicated freeway segments during peak rush hours on incident-free weekdays.

Weekends, holidays and days in which traffic is influenced by accidents, special events and lane closures are not reflected on this map.

Congestion delay is defined as the difference in travel time between 60 km/h (35 mph) and the lower congested speed.

Scale 1:300,000

**EXHIBIT 3-20
DISTRICT 7
LOS ANGELES-VENTURA AREA
2003 P.M. CONGESTION MAP**



Note:

This map is representative of congestion on the indicated freeway segments during peak rush hours on incident-free weekdays.

Weekends, holidays and days in which traffic is influenced by accidents, special events and lane closures are not reflected on this map.

Congestion delay is defined as the difference in travel time between 60 km/h (35 mph) and the lower congested speed.

3.6 District 8: San Bernardino-Riverside Area

Exhibit 3-21 summarizes weekday recurrent congestion in District 8 during 2003 compared to 2002. Exhibit 3-22 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-23 and 3-24 are maps showing the location and duration of AM and PM period congestion.

The 2002 data used in this congestion monitoring report are based on fall data collected from a combination of loop detectors and tachometer vehicles. Prior to 1998, delay estimates were based on both spring and fall tachometer data. Beginning in 2001, District 8 began to use fall loop detector data to estimate delay for some route segments. Other segments continued to be monitored using tachometer equipped vehicles. In 2003, no tachometer data collection was performed due to resource constraints. The delay on tachometer segments was estimated by using data taken from nearby loop detectors.

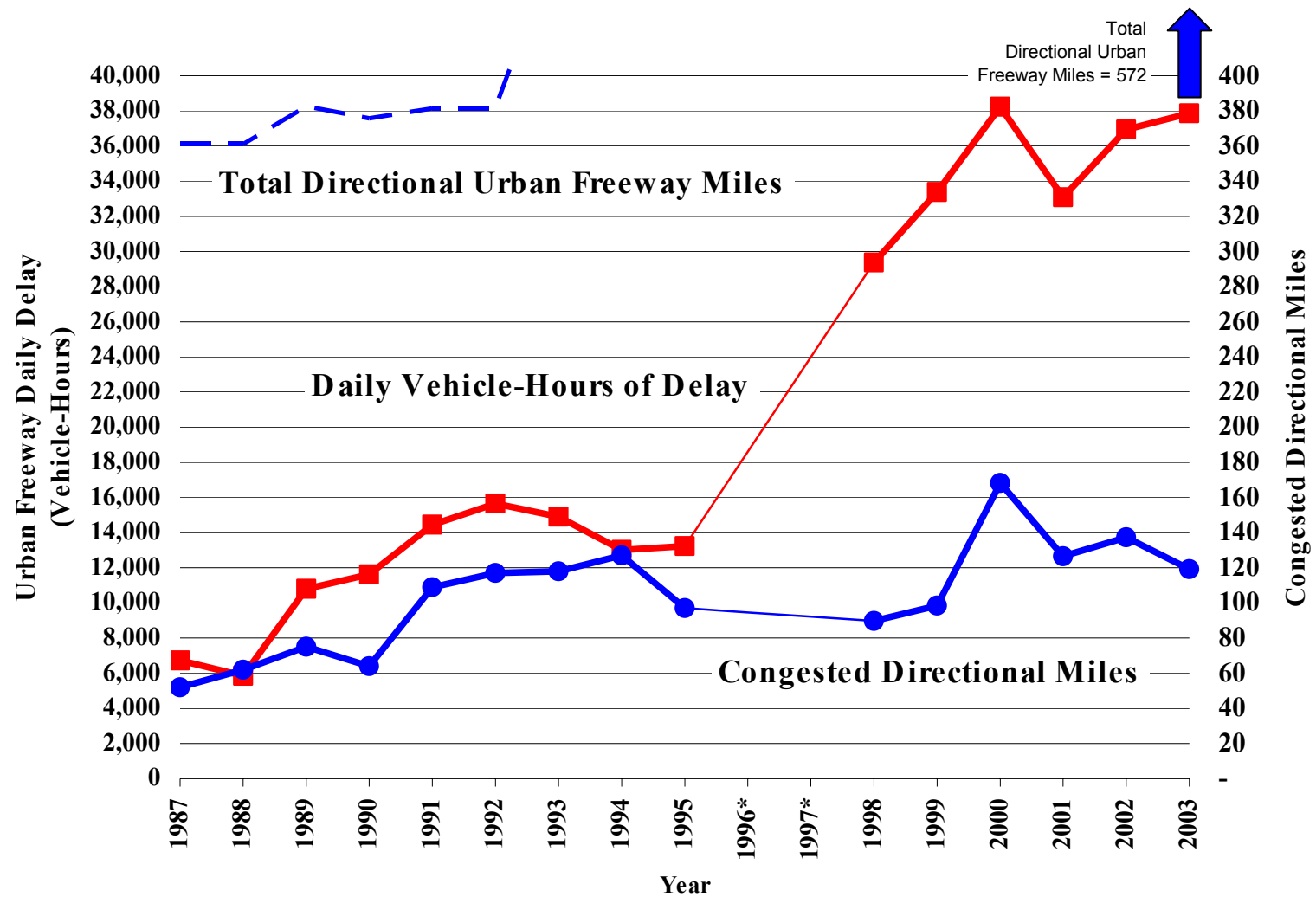
In 2003, the total vehicle-hours of delay per day (vhdpd) were 37,860 hours compared to 36,935 hours reported for 2002 (an increase of three percent). Congested directional miles (cdm) were nearly 119 miles in 2003, a decrease of 13 percent over the 137 miles reported in 2002.

Exhibit 3-21: District 8 Highway Congestion Summary

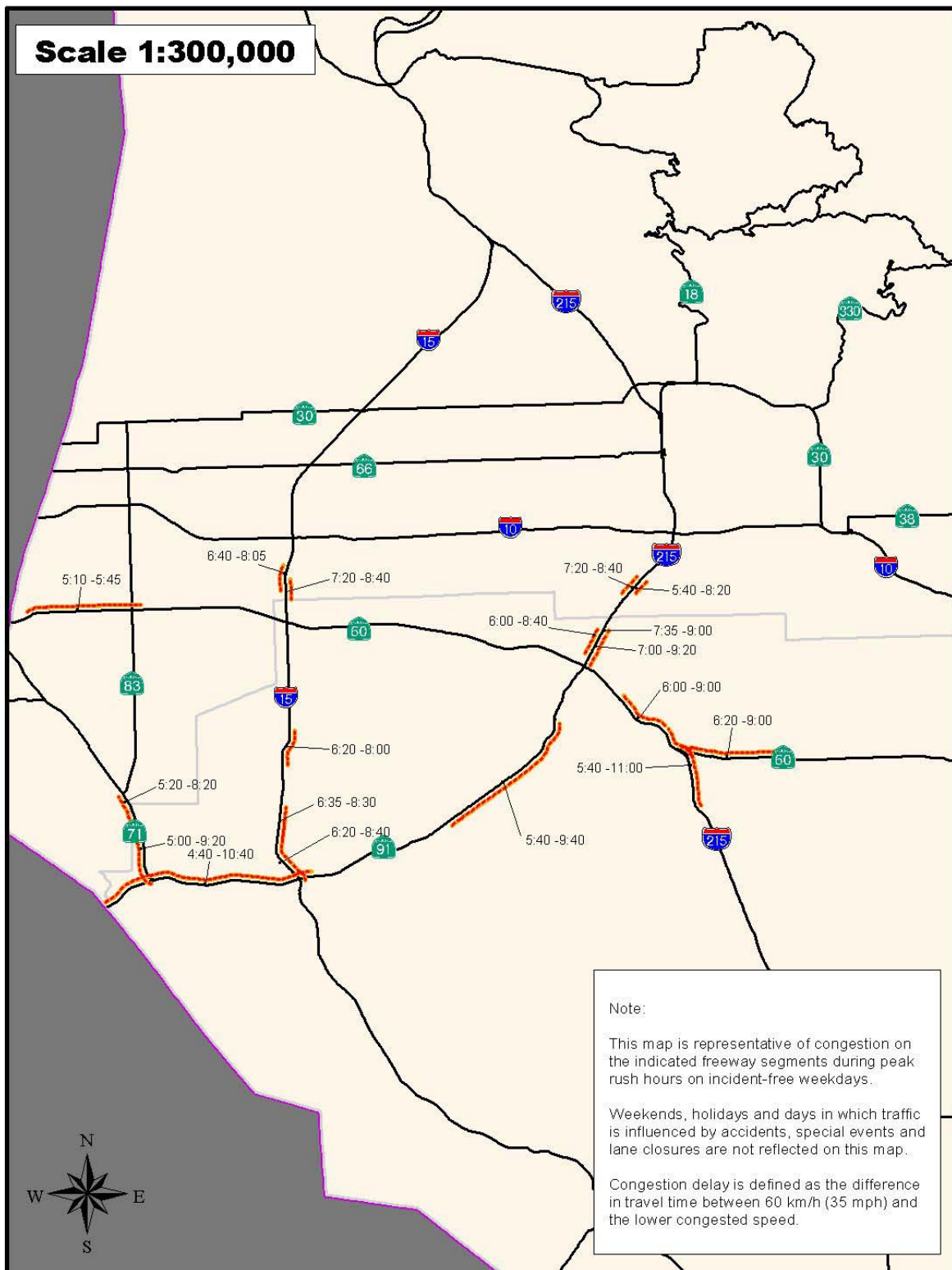
District 8	2002	2003*	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	36,935	37,860	3%	8%
Riverside	26,549	30,606	15%	
San Bernardino	10,386	7,254	-30%	
Congested Directional Miles	137.4	119.3	-13%	6%
Riverside	74.8	72.5	-3%	
San Bernardino	62.6	46.8	-25%	
Total Urban Area Freeway Directional Miles	571.6	571.6		
Congested Miles/Total Urban Freeway Miles	24%	21%		

* - Daily vehicle hours of delay in 2003 were estimated for some segments. Congested directional miles assumed to not have changed between 2002 and 2003 for those segments where no data collection was performed.

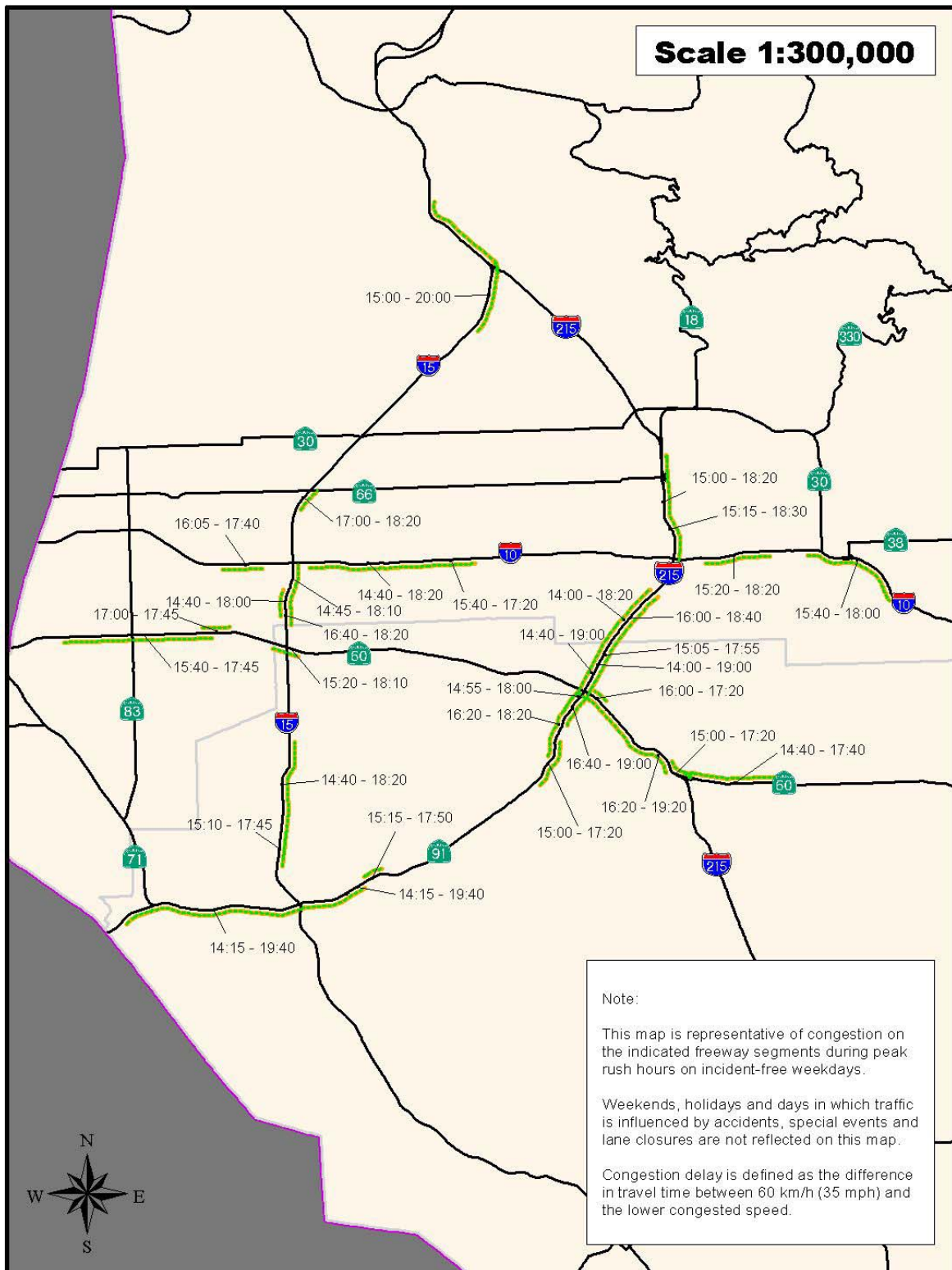
Exhibit 3-22: District 8 Congestion Trends 1987-2003



* - No statewide report developed in 1996 or 1997.



**EXHIBIT 3-23
DISTRICT 8
SAN BERNARDINO-RIVERSIDE AREA
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-24
DISTRICT 8
SAN BERNARDINO-RIVERSIDE AREA
2003 P.M. CONGESTION MAP**

3.7 District 10: Stockton Area

Exhibit 3-25 summarizes weekday recurrent congestion in District 10 during 2003 compared to 2002. Exhibit 3-26 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-27 and 3-28 are maps showing the location and duration of AM and PM period congestion.

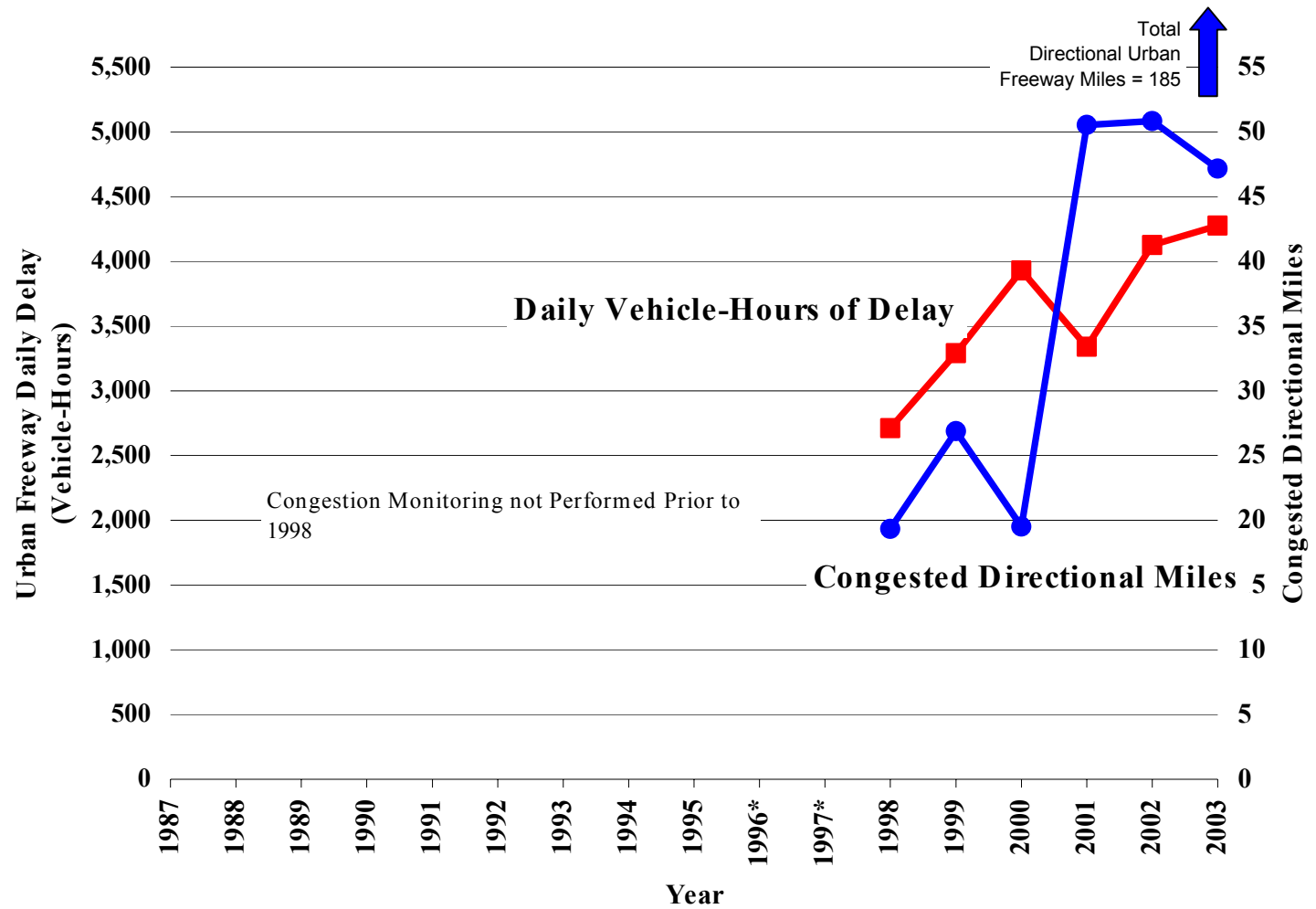
Both the 2002 and 2003 data used in this statewide congestion monitoring report are based on fall data collection efforts. District 10 has been monitoring traffic congestion for the HICOMP report since 1998.

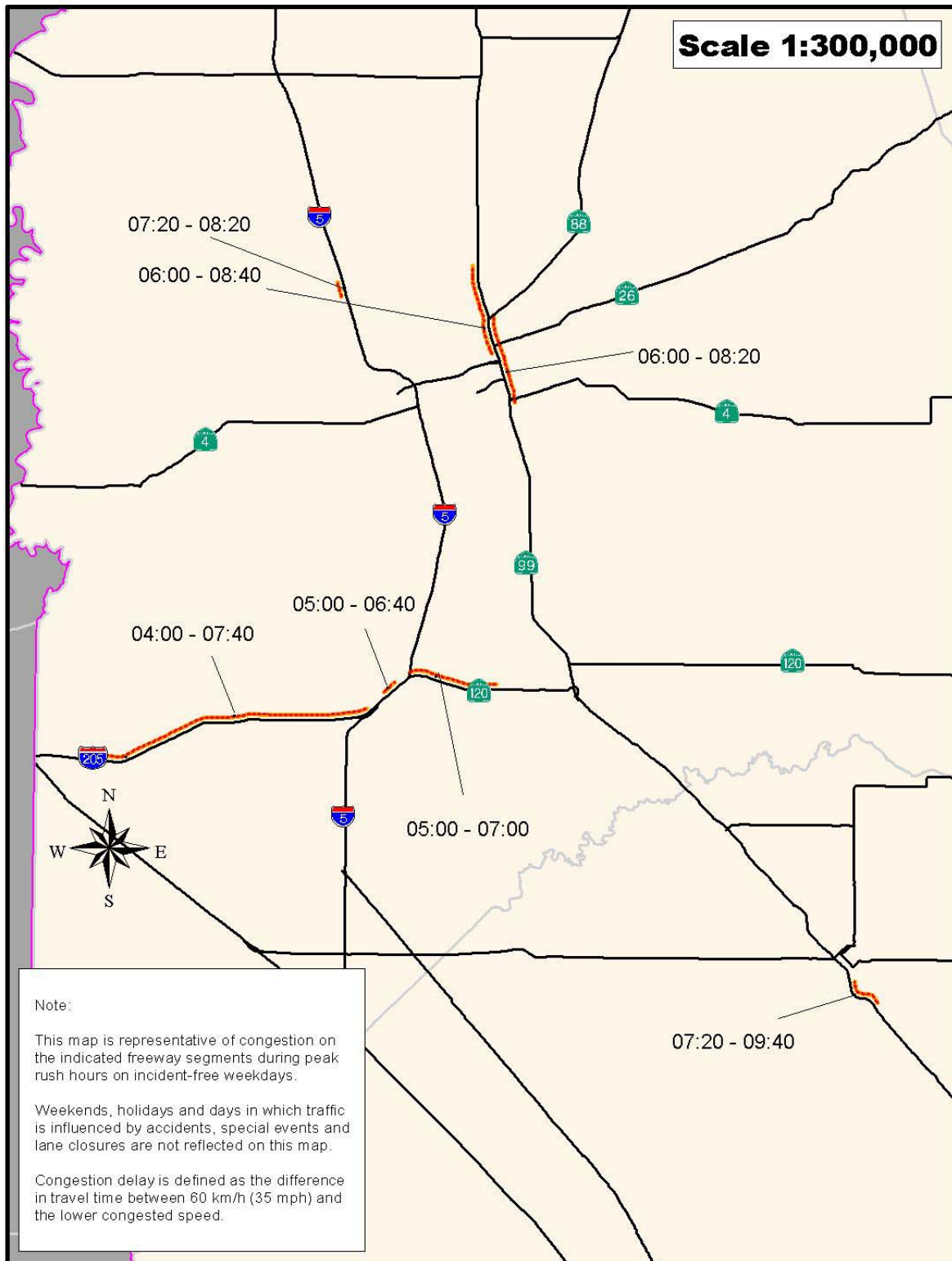
In 2003, the total vehicle-hours of delay per day (vhdpd) were 4,277 compared to 4,127 hours reported for 2002 (a four percent increase). Congested directional miles (cdm) were 47 miles in 2003, down nearly 4 miles from 2002.

Exhibit 3-25: District 10 Highway Congestion Summary

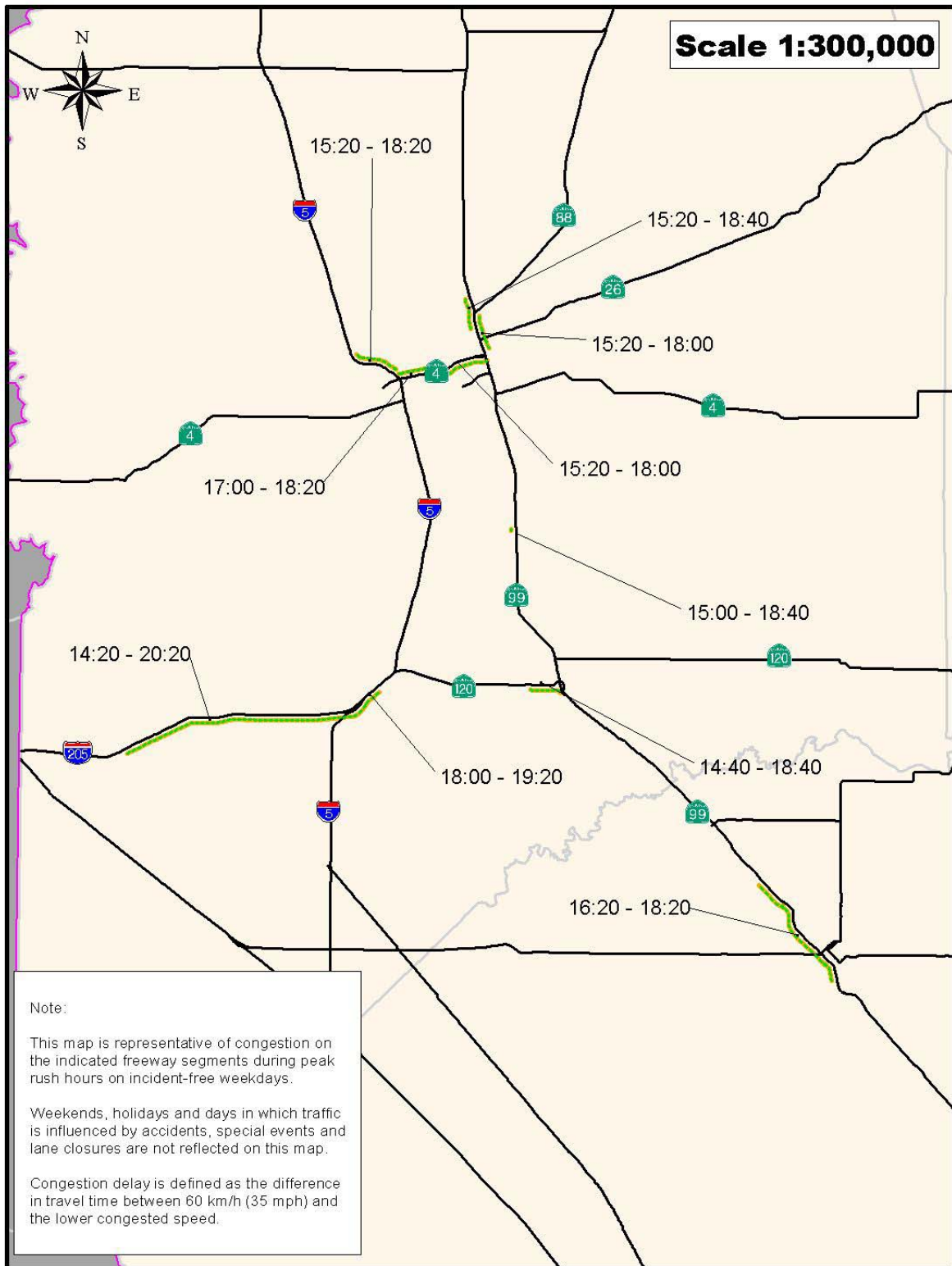
District 10	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	4,127	4,277	4%	1%
San Joaquin Stanislaus	4,085 41	3,497 780	-14% 1784%	
Congested Directional Miles	50.8	47.2	-7%	2%
San Joaquin Stanislaus	46.8 4.0	38.4 8.7	-18% 117%	
Total Urban Area Freeway Directional Miles	182.0	185.4		
Congested Miles/ Total Urban Freeway Miles	28%	25%		

Exhibit 3-26: District 10 Congestion Trends 1998-2003





**EXHIBIT 3-27
DISTRICT 10
STOCKTON AREA
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-28
DISTRICT 10
STOCKTON AREA
2003 P.M. CONGESTION MAP**

3.8 District 11: San Diego Area

Exhibit 3-29 summarizes weekday recurrent congestion in District 11 during 2003 compared to 2002. Exhibit 3-30 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-31 and 3-32 are maps showing the location and duration of AM and PM period congestion.

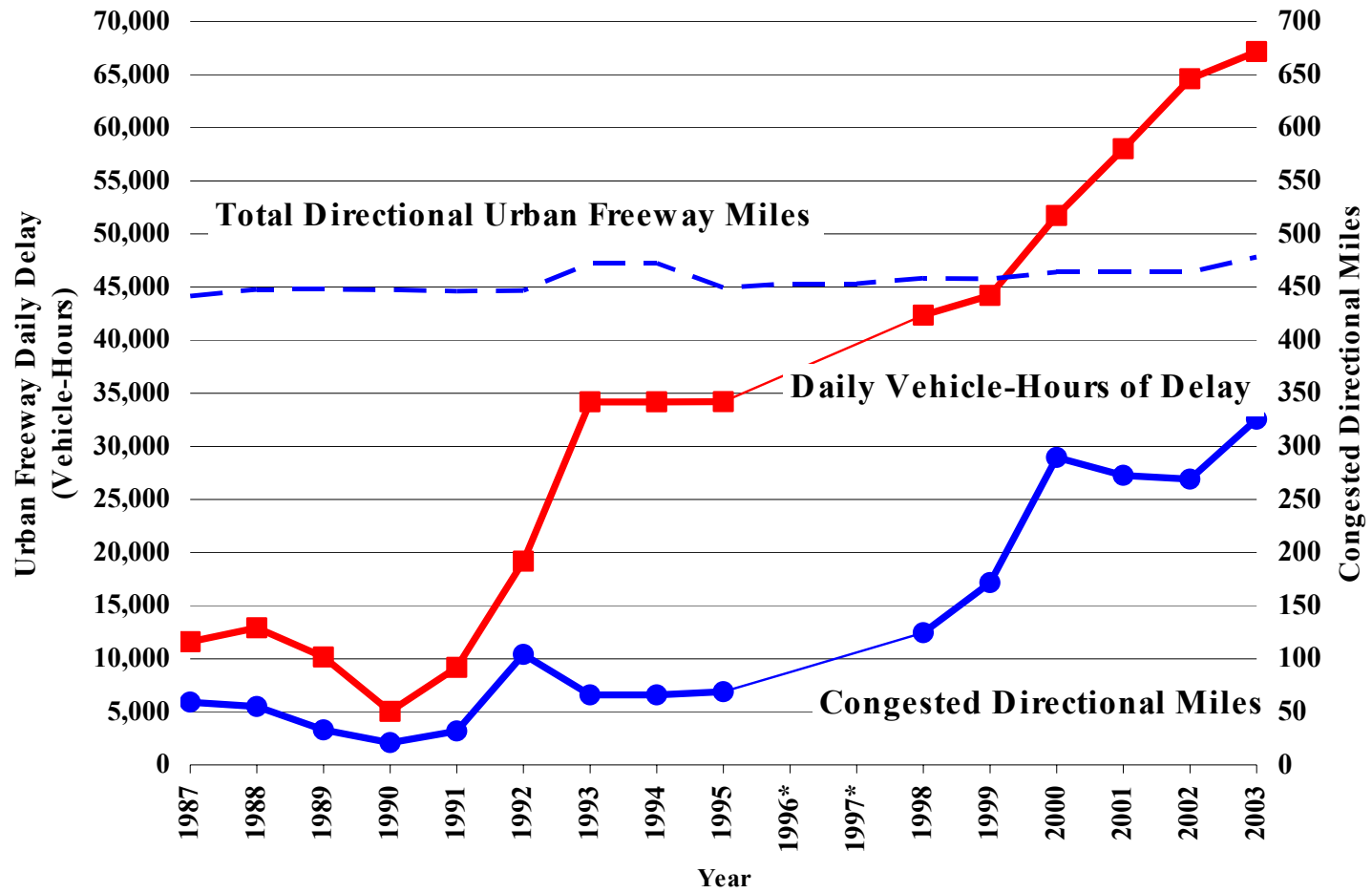
Both the 2002 and 2003 data used in this statewide congestion monitoring report are based on fall data collection efforts only. Prior to 1998, delay estimates were based on both spring and fall tachometer data. Since 1998, District 11 has been using fall loop detector data to estimate delay for many route segments. Other segments were monitored using tachometer equipped vehicles.

In 2003, the total vehicle-hours of delay per day (vhdpd) were 67,163 compared to 64,595 hours reported for 2002 (an increase of four percent). Congested directional miles (cdm) were 326 miles in 2003, a 21 percent increase from the 269 miles in 2002.

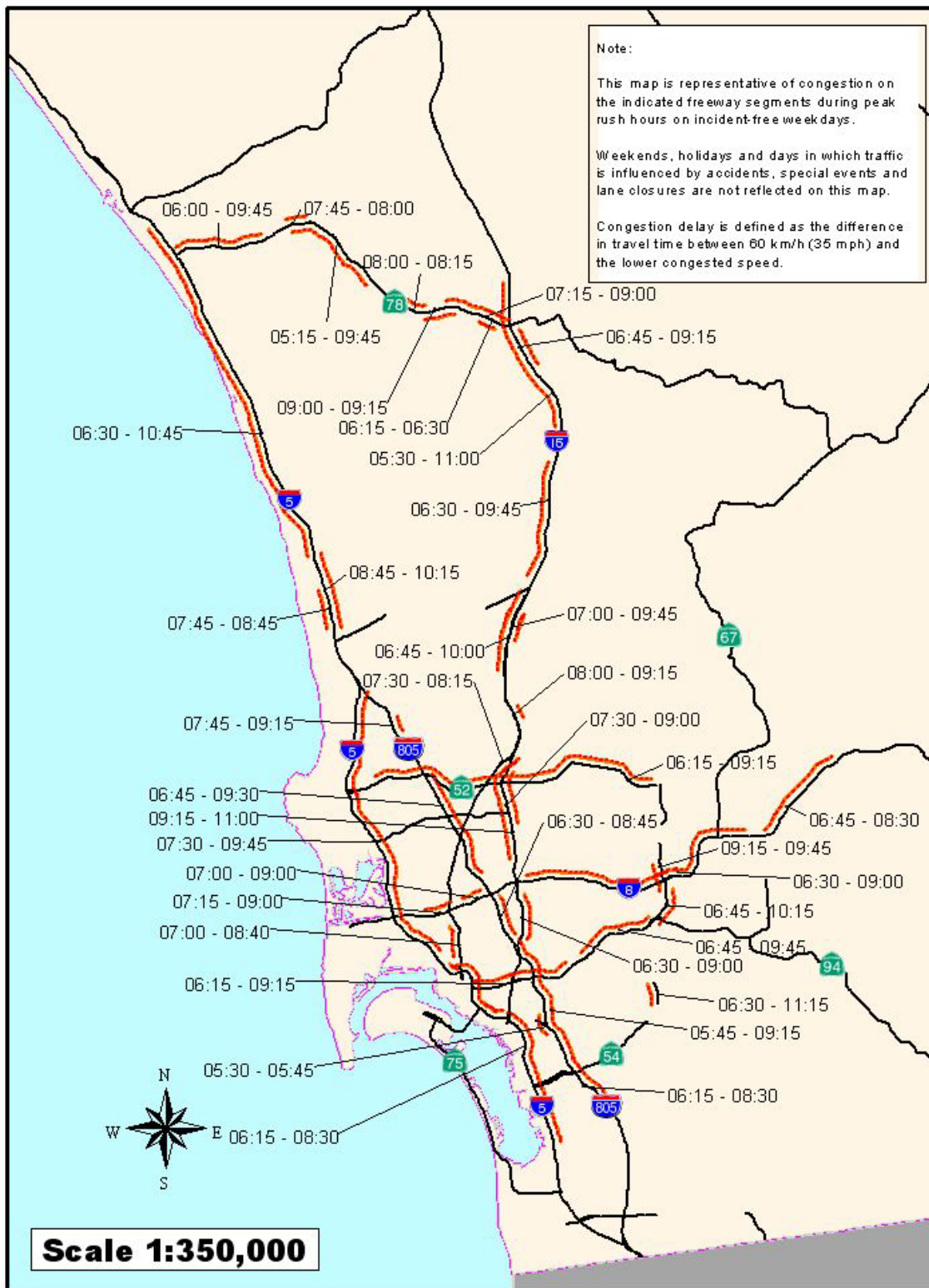
Exhibit 3-29: District 11 Highway Congestion Summary

District 11	2002	2003	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	64,595	67,163	4%	14%
San Diego	64,595	67,163	4%	
Congested Directional Miles	269.0	325.5	21%	16%
San Diego	269.0	325.5	21%	
Total Urban Area Freeway Directional Miles	464.0	478.4		
Congested Miles/ Total Urban Freeway Miles	58%	68%		

Exhibit 3-30: District 11 Congestion Trends 1987-2003



* - No statewide report developed in 1996 or 1997.



**EXHIBIT 3-31
DISTRICT 11
SAN DIEGO AREA
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-32
DISTRICT 11
SAN DIEGO AREA
2003 P.M. CONGESTION MAP**

3.9 District 12: Orange County

Exhibit 3-33 summarizes weekday recurrent congestion in District 12 during 2003 compared to 2002. Exhibit 3-34 presents trends in daily vehicle-hours of delay and congested directional miles for the district. Exhibits 3-35 and 3-36 are maps showing the location and duration of AM and PM period congestion.

The 2003 data were based on estimates derived from loop detectors, which differs from how data has been collected in the past. New data collected in 2004 will help verify the congestion trend from the past 10 years, and the 2003 report can be modified accordingly. The 2002 data used in this statewide congestion monitoring report are based on fall data collected from a combination of tachometer-equipped vehicles and loop detectors. Prior to 1998, delay estimates were based on both spring and fall tachometer data.

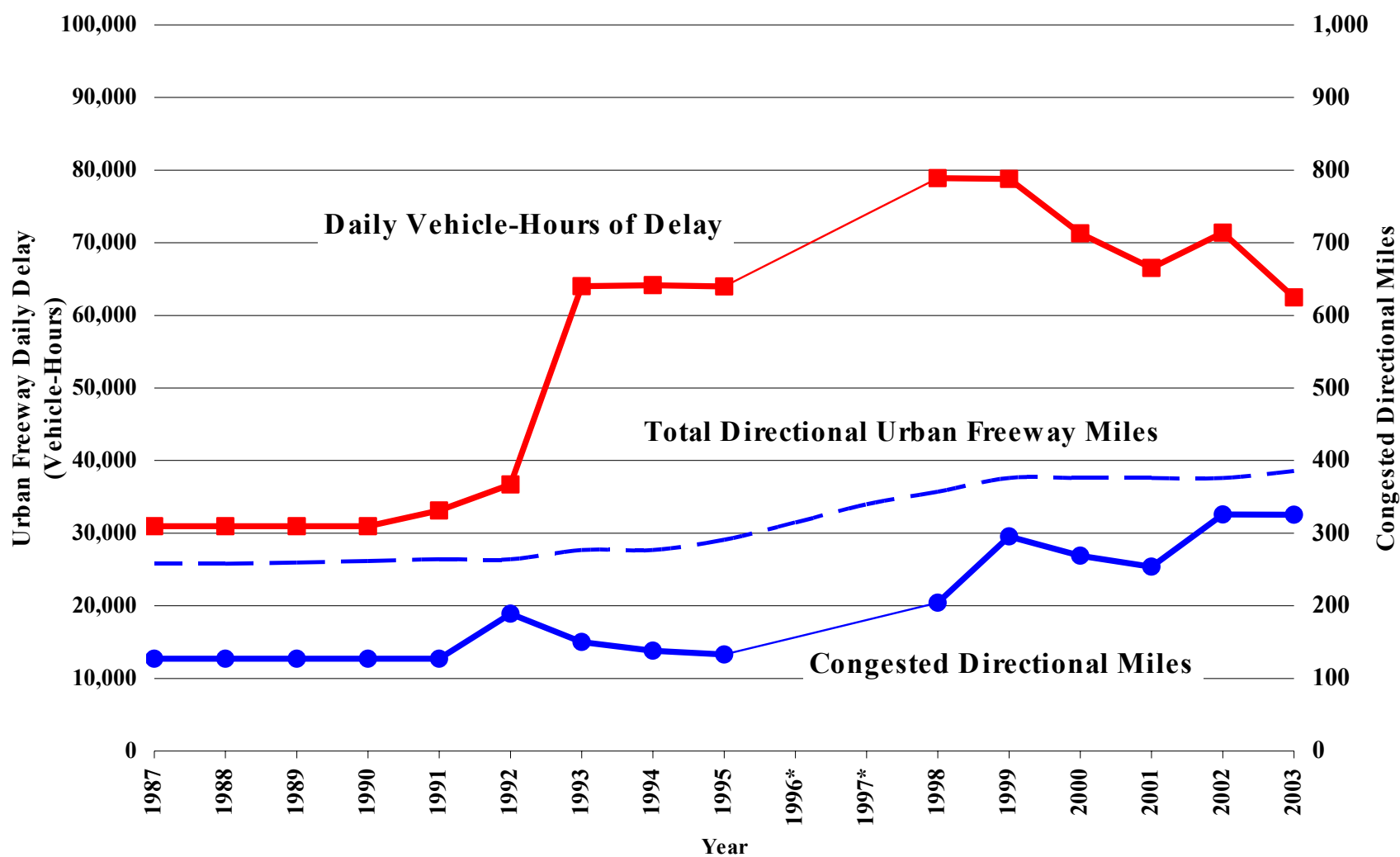
In 2003, the total vehicle-hours of delay per day (vhdpd) were 62,468 compared to 71,376 hours reported for 2002 (a 12 percent decline). Congested directional miles (cdm) were assumed to remain the same as in 2002 at 326 miles.

Exhibit 3-33: District 12 Highway Congestion Summary

District 12	2002	2003*	Percent Change 2002-2003	Percent of Statewide 2003
Daily Vehicle Hours of Delay	71,376	62,468	-12%	13%
Orange	71,376	62,468	-12%	
Congested Directional Miles	325.6	325.6	0%	16%
Orange	325.6	325.6	0%	
Total Urban Area Freeway Directional Miles	376.0	385.5		
Congested Miles/ Total Urban Freeway Miles	87%	84%		

* - Daily vehicle hours of delay in 2003 were estimated. Congested directional miles assumed to not have changed between 2002 and 2003.

Exhibit 3-34: District 12 Congestion Trends 1987-2003



* - No statewide report developed in 1996 or 1997.



**EXHIBIT 3-35
DISTRICT 12
ORANGE COUNTY
2003 A.M. CONGESTION MAP**



**EXHIBIT 3-36
DISTRICT 12
ORANGE COUNTY
2003 P.M. CONGESTION MAP**

Appendix A: Caltrans District and County Map



Numbers highlighted in **BLUE** are district numbers.

Appendix B: Caltrans Contacts

District	Contact Person	Public Number	Email Address
03	Matt Taghipour	(916) 859-7950	Matt_Taghipour@dot.ca.gov
04	Ron Kyutoku	(510) 286-4640	Ron_Kyutoku@dot.ca.gov
05	Roger D. Barnes	(805) 594-6190	Roger_D_Barnes@dot.ca.gov
06	Albert Lee	(209) 488-4111	Albert_Lee@dot.ca.gov
07	Kirk Patel	(213) 897-1825	Kirk_Patel@dot.ca.gov
08	Hamid Samani	(909) 383-4476	Hamid_Samani@dot.ca.gov
10	Arlene Cordero	(209) 948-3894	Arlene_Cordero@dot.ca.gov
11	Foroud Khadem	(619) 718-7848	Foroud_Khadem@dot.ca.gov
12	Farid Nowshiravan	(949) 756-7639	Farid_Nowshiravan@dot.ca.gov
HQ	Rex Cluff	(916) 651-9059	Rex_Cluff@dot.ca.gov

Appendix C: Glossary of Terms

Directional Mile – A one-mile length of freeway has two directional miles, irrespective of number of lanes.

Duration – The length of time the freeway directional segment remains congested expressed in hours.

Extent – The length of freeway segment, by direction, experiencing speeds below 35 mph for 15 minutes or more. Extent is expressed in terms of congested directional miles (cdm).

Freeway Service Patrol (FSP) – Free tow service that assists disabled motorists in congested urban areas.

High Occupancy Vehicle Lanes (HOV) – Lanes on freeways restricted to vehicles carrying more than one person or to public transportation vehicles. Minimum vehicle occupancies can be either two or three people depending on the highway segment. HOV lanes are designed to encourage ridesharing.

Magnitude – The difference in travel time between 35 mph and the lower congested speed and is expressed in terms of vehicle-hours of delay per day (vhdpd).

Metered Connector – Ramp meter on a freeway-to-freeway connector.

Non-Recurrent Congestion – Caused by events that occur irregularly such as accidents, sporting events, and maintenance or construction.

Ramp Metering – Signal on a ramp to regulate the flow of traffic onto the freeway.

Recurrent Congestion - A condition lasting for 15 minutes or longer where travel demand exceeds freeway design capacity, as evident by vehicular speeds of 35 mph or less occurring during peak commute periods on a typical, incident-free weekday.

Surveillance Stations – All detector locations including ramp-metering stations are termed surveillance stations.

Arnold Schwarzenegger
Governor

Sunne Wright McPeak
Secretary, Business, Transportation and Housing Agency

Will Kempton
Director, California Department of Transportation

Karla Sutliff
Division Chief, Traffic Operations

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